VOLUME III, No. 3 June, 1961

EDUCATIONAL RESEARCH

A Review for
Teachers and all concerned with
Progress in Education

SECRETARY'S OFFICE COPY
DO NOT REMOVE

Published for
THE NATIONAL FOUNDATION FOR EDUCATIONAL RESEARCH IN ENGLAND AND WALES

by
NEWNES EDUCATIONAL PUBLISHING CO. LTD.
Tower House, Southampton Street, Strand, London, W.C.2

EDUCATIONAL RESEARCH

Editor:
W. D. WALL
assisted by
D. A. PIDGEON K. M. MILLER
D. WILSON BELL

Educational Research is published for the National Foundation by Newnes Educational Publishing Co., Ltd., once a term, in November, February and June. The price per issue (post free) throughout the world is 5/6 and the annual subscription (post free) is 16/6.

Subscriptions, orders and advertisements should be sent to Newnes Educational Publishing Co., Tower House, Southampton Street, Strand, London, W.C.2.

Communications on general editorial matters including MSS. for publication, books and other printed matter for review or abstracting should be sent to the Director, N.F.E.R., 79, Wimpole Street, London, W.1.

Note to contributors: Contributions which make a readable synthesis of valid research on the practical problems posed by the English educational system will be particularly welcome. The length of such contributions should be between 4,000-7,000 words, though shorter notes will be considered. Abstracts of theses or similar material should be of sufficient length and detail to acquaint the reader with the main outcomes of the work, the sampling on which it has been based and the experimental statistical and other techniques used. Such synopses should be submitted in agreement with the head of the university department concerned.

All papers submitted for publication should conform to the conventional usage of the review and especially to the form in which bibliographical references are given. They should be typed (double space) on one side of quarto paper.

Intending contributors would be well advised in the first instance to send to the editor a brief synopsis of their paper with the elements of a bibliography.

In certain cases it may be possible for the Foundation's Information Service to aid in the gathering of relevant research material.

Only material which has not been published already elsewhere can normally be accepted for publication. The copyright in any material published is retained by the Editor. Reproduction in whole or in part is forbidden except (i) under the terms of the Fair Copying Declaration of the Royal Society or (ii) when specific permission has been given by the Editor.

Contributors receive fifteen off-prints of their article and five free copies of the number in which it appears. Further off-prints may be ordered at cost price when the proofs are returned to the Editor.

The conclusions drawn and the opinions expressed in papers are those of the authors. They should not be taken to represent the view of the N.F.E.R.

VOLUME III, No. 3 June, 1961

EDUCATIONAL RESEARCH

A Review for
Teachers and all concerned with
Progress in Education

Published for
THE NATIONAL FOUNDATION FOR EDUCATIONAL
RESEARCH IN ENGLAND AND WALES

by
NEWNES EDUCATIONAL PUBLISHING CO. LTD.
Tower House, Southampton Street, Strand, London, W.C.2

A New Publication:

THE NATIONAL FOUNDATION FOR EDUCATIONAL
RESEARCH IN ENGLAND AND WALES

TECHNICAL
EDUCATION ABSTRACTS

Technical Education Abstracts provides an information service for all those inside and outside the public educational system concerned with technical and further education including education and training for industry, commerce and agriculture at all levels.

Individual Abstracts are prepared by specialists in technical colleges, teacher training colleges, universities and industry. They give the essential bibliographical data and concise summaries of the articles or correspondence to which they refer. Abstracts are drawn from a wide range of sources, including both periodicals and separately published works.

Publication is quarterly, in March, June, September and December. Each issue has subject, author and title indexes. Issues dealing with special subjects may also be published from time to time.

Editorial Correspondence should be addressed to *Technical Education Abstracts*, National Foundation for Educational Research in England and Wales, 79 Wimpole Street, London, W.1.

Subscriptions £2. 2s. per volume of four quarterly issues (approx. 40 pages), payable in advance and running from the 1st January to the 31st December.

Cash with order please, to N.F.E.R., 79 Wimpole Street, London, W.1.

SOCIAL STRUCTURE, LANGUAGE AND LEARNING

by Basil Bernstein, *University College, London.*

NO one in his right mind would plan an educational programme without taking into account the age of the pupils, their levels of maturity, intellectual and emotional, their interests and, of course, their social background. However, the extent to which we take account of these factors varies, and of equal importance is *how* we take account of them. It is the contention of this paper that we have failed to think through systematically the relationship between the pupil's background and the educational measures appropriate to successful learning. This is not say that we have no information. Many researches have shown a relationship between a bit of the child and a bit of education. Often the teacher and the researcher is the same person at a later point in time but it seems that we are still engaged on psychological or sociological matching.

Although training colleges are aware of the importance of the pupil's social background and sociology is accepted as an important part of teacher training, there is little sign that an educational programme has been systematically thought through for the pupil whose origins are lower working class—approximately 29% of the population. This does not mean that we do not possess an armoury of visual aids, folk dancing, guitar playing, or text books for the slow but ' normal ' learner. The teacher does not lack advice on problems of discipline, from the suggestion that ' louts should teach louts ' to *From Innocence to Experience: without the aid of the cane.* Some think it is simply a matter of class-size but fail to see that it may be a question of which sized class for which particular group of normal children. A few pieces of contemporary research have indicated that it is equivocal to suggest that size of class matters; and yet we have no criterion by which to judge what constitutes a significant difference in size. Is it a drop in number from forty to thirty or a reduction to fifteen? Is it perhaps of greater importance whether the pupils come from the middle or lower working-class?

The general problems involved in teaching children from the lower working-class relative to those from the middle-class, are not necessarily problems of teaching children who differ in an innate capacity to learn as indicated by tests of intelligence. In fact, the evidence indicates that there must be a greater absolute number of children with very high intelligence in the lower than in the higher social groups.* What is of greater interest, is that there appears to be in different social groups a particular and different relationship between scores on group verbal and non-verbal tests, (for example, the Mill Hill Vocabulary Test and Raven's Progressive Matrices). In lower working-class groups the verbal scores are grossly depressed in relation to the scores at the higher levels of the non-verbal test. The scores on the verbal test of the majority of children from this group tend to fall within the average range of the test whilst the scores on the non-verbal test tend to yield a normal curve of distribution skewed to the right, that is, in the direction of the highest scores.

* The statement refers to the *total* number of manual workers (the customary working-class group) *not* to the lower working-class considered as a sub-group.

Educational performance as judged by attainment in class is related to the scores on the group verbal test. A fairly consistent pattern emerges which reveals that as the boys' scores move towards the highest points possible on the non-verbal test the gap between the scores on the two types of test widens. As the present writer found, differences here are of the order of 20 + I.Q. points. In a sample of pupils attending a famous Public school this relationship, found in the working-class, was not present. The depressed scores on the verbal test for those working-class boys who have very high non-verbal scores, could be expected in terms of the linguistic deprivation experienced in their social background. This raises the question of the relationships between potential and developed intelligence and education.

In the light of what we know from much research, we can suggest a pattern of difficulties which the lower working-class pupil experiences in trying to cope with education as it is given in our schools. This will not hold in precise detail for every pupil, but we can say that the probability of finding such a pattern is greater if the pupil's origin is lower working-class.

Such children will experience difficulty in learning to read, in extending their vocabulary, and in learning to use a wide range of formal possibilities for the organisation of verbal meaning; their reading and writing will be slow and will tend to be associated with a concrete, activity-dominated, content; their powers of verbal comprehension will be limited; grammar and syntax will pass them by; the propositions they use will suffer from a large measure of dislocation; their verbal planning function will be restricted; their thinking will tend to be rigid—the number of new relationships available to them will be very limited.

In arithmetic they may master the mechanical operations involved in addition, subtraction and multiplication, provided they have also mastered their tables, but they will have some difficulty in division. However, verbal problems based upon these operations may confuse them. They will have great difficulty in ordering the verbal argument before applying the operations. They will tend to learn a particular set of operations in relation to a discrete context and they will have difficulty in generalising the operations to a wide range of contexts. Their conception of number will be restricted. As the progression shifts from the mechanical application of fractions and simple percentages to relatively more sophisticated expressions, their lack of understanding of arithmetical *processes* will be revealed. Ratio may well be a point in the gradient of difficulty which they are unable to pass. As they develop, failure in their basic understanding will limit what they can do despite persistence and application.

Their time-span of attention will be brief and this will create the problem of holding and sustaining attention. They are not interested in following the detailed implications of a concept or object and the matrix of relationships which this involves; rather they are disposed towards a cursory examination of a series of different things. Their interest in *processes,* even those which are linked to their everyday experience, is limited. As soon as the formal dimension of the process is reached they begin to be uneasy. The interval between feeling and doing is short and this facilitates the acting out of impulse behaviour. Their curiosity is limited which removes an important dynamic from learning. They tend to require a very clear-cut educational experience with little ambiguity in direction

and content. They are highly suspicious of anything which does not look like education as they traditionally conceive it. In the *short run* democratic appeals are less successful than dictatorial edicts.

Although the pupil may pass the primary stage without a great sense of unease, the discrepancy between what he is called upon to do and what he can do widens considerably at the secondary level. The character of the educational process changes at this level. It becomes increasingly analytic and relies on the progressive exploitation of what Piaget calls *formal* operations, whereas lower working-class pupils are more likely to be restricted to *concrete* operations. Finally, and with somewhat less confidence, we may say that there is a general flatness in their over-all educational achievements in the basic subjects. Although there may be one or two small peaks, in the main such pupils are confined to the average level. It is, I suggest, a peculiarly undifferentiated educational performance.

No mention has been made—deliberately—of the reduced motivation to learn, of the lack of involvement in the means and ends of education, of the standardised reactions, which are an unhappy defence against the despair and failure which school symbolises, and of the problems of discipline which are so generated. The central problem for the lower working-class child is, primarily, that of learning *how* to learn and secondly, that of learning *what* has to be learned. To make the educational experience happy and contented is not necessarily to solve the problems of learning, if this is achieved by by-passing the problem and playing directly into a concrete perceptual set—as is done by much use of visual and concrete material. Sometimes class control is considered as a substitute, instead of as a condition, for learning. The problem however is *not* how to get the pupil interested but what to do *after* his interest has been elicited.

There is, of course, a wide range of individual differences and, it must be expected, such patterns will not be found with all children of the particular social background under discussion; nor are they confined to such pupils; it is suggested, however, that there is a higher expectation of finding this pattern of educational performance with the social group mentioned than with others.

How does this happen? What is the most important single factor in a boy's history, which generates this consistency of emotional and intellectual behaviour in the learning situation? It is not good enough to say that he thinks descriptively and is insensitive to abstract formulations, that he is concerned with substance rather than process, or, on a more sociological level, that there exists a clash in values between the school and the home, that the orientation of education is middle-class. These, and many others, are descriptive statements, which describe differences between some part of the boy and some part of the school. The question raised here is a dynamic one. How does the boy become like this and what is the main agency through which this becoming is facilitated and reinforced?

I suggest that forms of spoken language induce in their learning, orientations to particular orders of learning, and condition different dimensions of relevance. Teachers, research workers and educationalists have all commented on the limited linguistic skill and vocabulary of lower working-class pupils and the difficulty of sustaining and eliciting adequate communication.

It is therefore not new to focus upon the use of language as judged by educational criteria. Nisbet thought that part of the negative correlation between family size and I.Q. was the result of the type of speech model made available to the child. He considered that this linguistic limitation effected in some way a general cognitive impoverishment. Mitchell (on the basis of an analysis of a battery of tests given to children of high and low social status), found that the verbal meaning and fluency scores for the low-status children could be used to predict their scores on a range of different factors. In this group there was a lack of differentiation among a number of functions whereas for the high-status group there was considerable differentiation. Studies reported by McCarthy, of children in the special environments of residential institutions, indicate that they suffer a grave language deficiency and that their powers of abstraction are often impaired.

Luria and Yudovitch recently studied identical twins who were grossly retarded in speech for non-organic reasons. The twins were subjected to experimental changes in their environment and the speech changes subsequent to this were noted. It was found that the twin who had received special language training was able to perform more efficiently upon his environment, through the development of discursive operations which were not available to the twin who had received no training and who served as a control. These studies and others point to the critical role of spoken language in the process by which the developing child achieves self-regulation. Of particular interest, is the relationship between forms of spoken language and the mode of self-regulation. It is the nature of this inter-relation I want to consider and its educational implications.

There is little doubt that the social form of a relationship acts selectively on the mode and content of the communication. The language of the child in a group of other children (as shown by the Opies) is very different in structure and content from that he uses when speaking to an adult. Similarly the spoken language of combat units in the armed services is different from that normally used in civilian life. Vigotsky maintained that the more the subject of a dialogue was held in common, the more probable is it that the speech will be condensed and abbreviated, for example we may think of the communication pattern between a married couple of long standing or that between old friends. In these relationships, meaning does not have to be made fully explicit; a slight shift of pitch and stress, a small gesture can convey a complex meaning. Communication goes forward against a backcloth of closely shared identifications and affective empathy which removes the need for elaborate verbal expression.

This communion of the spirit which underlies and conditions the form of the communication may render what is actually said, gravely misleading to an observer who does not share the history of the relationship. The *how* of the communication is heavily burdened with implicit meanings. Some of the verbal meanings are restricted and not elaborated. The observer will be struck by the measure of his own exclusion and this will be reinforced by the expressive intimacy, vitality and warmth which accompanies what is said. The content is likely to be concrete and descriptive rather than analytical and abstract. The backcloth of closely shared identifications which create empathy gives to the speech sequences, from the point of view of the observer, a large measure of dislocation. The dialogue appears somewhat disjunctive because of the logical breaks which interrupt the flow of information.

What is the effect on behaviour if this form of spoken language is the *only* one which individuals have at their disposal? What are the implications if individuals are unused to signalling meaning unless it is against a background of common and closely held identification whose nature has rarely, if ever, been verbally elaborated and made explicit? What is the result of learning to operate with restricted speech structures where the burden of meaning may lie not so much in what is said, but how it is said, where language is used *not* to signal and symbolise, fairly explicitly, individual separateness and difference but to increase consensus? This does not mean that no disagreements will take place. What does it mean, in terms of verbal conceptual growth, if speech is only, or mainly, used in circumstances where the intent of the other person may be taken for granted and no pressure induces the need to create speech specially to fit the needs of those outside the group who do not share its experience? Where the number of situations which serve as stimuli for verbalisation is restricted by the conditions and form of the social relationship?

It is suggested that this is the situation in which many children of the lower working-class grow up. Their society is *limited* to a form of spoken language in which complex verbal procedures are made irrelevant by the system of non-verbal, closely shared, identifications which serve as a backcloth to the speech. The form of the social relationship acts selectively on language potential. Verbalisation is limited and organised by means of a narrow range of formal possibilities. These restricted formal strategies, for the sustained organisation of verbal meaning, are capable of solving a comparatively small number of linguistic problems, yet, for this social group they are the *only* means of solving all and every verbal problem requiring a sustained response. It is not a question of *vocabulary*: it is a matter of the *means* available for the organisation of meaning and these means are a function of a *special type of social relationship*. The size of the vocabulary is a function of other variables as will be shown: it is a symptom but not a cause of the speech form, although, in its own right it acts as a reinforcing agency.

The linguistic relationship between the lower working-class mother and her child is such that little pressure is placed upon the child to verbalise in a way which signals and symbolises his unique experience. The ' I ' of the mother, the way she organises and qualifies her experience, will be transmitted to the child *not* through evoking speech which is specially cut for this purpose. Spoken language is *not* perceived as a major vehicle for presenting to others inner states of the speaker. What can be said is limited by the rigid and limited possibilities for verbal organisation. It is a combination of non-verbal signals with a particular structure of verbal signals which originally elicits, and later reinforces, a preference in the child for a special type of social relationship, which is limited in terms of verbal explicitness and relies heavily on a pattern of non-verbal signals. The ' I ' of the lower working-class mother is not, relatively, a verbally differentiated ' I.'

The shift of emphasis from non-verbal to verbal signals, in the middle-class mother-child relationship, occurs earlier and the pattern of the verbal signals is far more elaborate (Bernstein 1961). Inherent in the middle-class linguistic relationship is a pressure to verbalise feeling in a relatively individual manner and this process is guided by a speech model which regularly and consistently makes available to the child the formal means whereby this process is facilitated.

It can be said that for the middle-class child there is a progressive development towards verbalising and making explicit, subjective intent, whilst this is *not* the case for the working-class child. This is not necessarily the result of a deficiency of intelligence but comes about as a *consequence* of the social relationship acting through the linguistic medium. It is through this developing medium that the child learns to internalise his social structure. His environment, and what is significant in his environment, is taken into himself, to become the sub-stratum of his consciousness by means of linguistic processing. And every time he speaks, his social structure is selectively reinforced. This does not deny the role of non-verbal learning but I suggest that even here, from an early age, the effects are fed through language and are stabilised by language. As speech marks out a pattern of stimuli to which the child adapts in the learning of this pattern, his perception is organised, structured and reinforced. The adequacy of his response is rewarded or punished by the adult model until the child is able to regulate his responses independently of the adult. In this way the outside gets into the inside from the very beginnings of speech. The appropriateness of the child's behaviour is thus conditioned to a wide variety of contexts by means of the vehicle of communication.

The lower working-class child learns a form of language which symbolises the normative arrangements of a local group rather than the individuated experience of each of its members. The form of the communication reinforces the pattern of social relationships but fails to induce in the child a need to create speech which uniquely fits his experience. Luria has suggested that speech may be considered as a complex of additional signals which leads to marked changes in the field of stimuli. It isolates, abstracts and generalises perceived signals and relates them to certain categories. Speech becomes a major means of selectively reinforcing perceptions. In the context of this discussion, forms of spoken language mark out what is relevant affectively, cognitively and socially and *experience is transformed by that which is made relevant.*

What is made relevant by the form of lower working-class speech is markedly different from that which is made relevant by the form of middle-class speech. The experience of children from these gross strata follows different paths from the very beginnings of speech. The type of learning, the conditions of learning and the dimensions of relevance initiated and sustained by the spoken language are completely different. In fact, it would not be too much to say that in strategic respects they are antithetical. The behaviour of the children is regulated according to separate and distinct principles. They have learned two different forms of spoken language; the only thing they have in common is that the words are English.

At this point a rather more rigorous definition is necessary of the two linguistic forms which, it is suggested, become the major instruments initiating and sustaining the socialisation process. The linguistic forms associated with the lower working-class I shall call a *public* language. Here it should be remembered that there will not be a one to one relationship between the lower working-class and this form of spoken language but the probability of its use is certainly very high. With this in mind, we may dispense with social class concepts and refer to types of spoken language and the behaviour sustained by them. Operationally, it is more accurate to use the linguistic forms to distinguish the groups rather than a particular class affiliation.

A *public* language is a form of language use which can be marked off from other forms by the rigidity of its syntax and the restricted use of formal possibilities for verbal organisation. It is a form of relatively condensed speech in which certain *meanings* are restricted and the possibility of elaboration reduced. In this case speech* does not become the object of special perceptual activity, neither is a theoretical attitude adopted to sentence organisation. Whilst it may not be possible to predict any one content of this language, the formal organisation and syntax is predictable for any one individual. The class of the content is also predictable. The characteristics of a *public* language are as follows:

1. Short, grammatically simple, often unfinished sentences with a poor syntactical form stressing the active voice.
2. Simple and repetitive use of conjunctions (so, then, because).
3. Little use of subordinate clauses to break down the initial categories of the dominant subject.
4. Inability to hold a formal subject through a speech sequence; thus a dislocated informational content is facilitated.
5. Rigid and limited use of adjectives and adverbs.
6. Infrequent use of impersonal pronouns as subjects of conditional clauses.
7. Frequent use of statements where the reason and conclusion are confounded to produce a categoric statement.
8. A large number of statements/phrases which signal a requirement for the previous speech sequence to be reinforced: " Wouldn't it? You see? You know?" etc. This process is termed ' sympathetic circularity.'
9. Individual selection from a group of idiomatic phrases or sequences will frequently occur.
10. *The individual qualification is implicit in the sentence organisation: it is a language of implicit meaning.*

A *formal* language is one in which the formal possibilities and syntax are much less predictable for any one individual and the formal possibilities for sentence organisation are used to clarify meaning and make it explicit. The person, when he speaks a *public* language, operates within a mode of speech in which individual selection and permutation are grossly restricted. In the case of a *formal* language the speaker is able to make highly individual selection and permutation. Of course, a *formal* language speaker does not always do this, but the possibility always exists for him. The characteristics of a *formal* language are:

1. Accurate grammatical order and syntax regulate what is said.
2. Logical modifications and stress are mediated through a grammatically complex sentence construction, especially through the use of a range of conjunctions and subordinate clauses.
3. Frequent use of prepositions which indicate logical relationships as well as prepositions which indicate temporal and spatial contiguity.

* This does not mean that the *quantity* of speech is necessarily reduced.

4. Frequent use of the personal pronoun ' I.'
5. A discriminative selection from a range of adjectives and adverbs.
6. Individual qualification is verbally mediated through the structure and relationships within and between sentences.
7. Expressive symbolism discriminates between meanings within speech sequences rather than reinforcing dominant words or phrases, or accompanying the sequence in a diffuse, generalised manner.
8. It is a language use which points to the possibilities inherent in a complex conceptual hierarchy for the organising of experience.

These characteristics must be considered to give a *direction* to the organisation of thinking and feeling rather than to the *establishing* of complex modes of relationships. The characteristics are relative to those of a *public* language.

Each of these two sets of criteria refers to an ideal linguistic structure but what will be found empirically is an orientation to this or that form of language use. It is clear that some of these characteristics will occur in most forms of language use but a *public* language is a form of usage in which all the relevant characteristics will be found. It is possible to consider approximations to a *public* language to the extent that other characteristics are not found. Although any one example of a *public* language will be associated with a particular vocabulary and sequence frequency, it is worth while emphasising that the definition and characterisation are independent of content. Here we are concerned with the implications of a general mode, not with the isolated significance of particular words or speech sequences. This is not to suggest that middle-class children are the only ones oriented to a *formal* language but the probability is certainly much higher for this group. Neither do such children learn only a *formal* language. The mode of speech used can and does, in most cases, vary according to the type of social relationship involved. The speech behaviour of middle-class children, or for that matter children from any class, will in the peer group, approximate to a *public* language, and will tend to release behaviour regulated by the form of speech. Middle-class children will have access to both forms which will be used according to the social context. This will lead to an appropriateness of behaviour in a wide range of contexts. Other children, a goodly proportion of the total population in this and other countries, are likely to be restricted to one form, a *public* language. This will be the only form known: the only one that can be used.

Some of the implications of this restricted form of linguistic behaviour have a bearing on the educational picture described at the beginning of this discussion. Because of the simple, often broken, sentence structure and the rigid range of formal possibilities available, a *public* language will be one in which logical modification and stress can only be crudely rendered linguistically. This necessarily affects the length and type of the completed thought. Of equal importance, the verbal planning function is shortened. The shortening of this function often creates, in sustained speech sequences, a large measure of dislocation or disjunction. The thoughts are strung together somewhat like passing beads on a frame rather than following a planned sequence. The restricted verbal planning function also creates a high degree of redundancy, by which is meant a large

measure of repetition of information or sequences which add little to what has previously been given. This is vividly illustrated by the two transcripts of tape-recorded discussion which follow:

> " It's all according like these youths and that if they get into these gangs and that they most have a bit of a nark around and say it goes wrong and that and they probably knock someone off I mean think they just do it to be big getting publicity here and there."
>
> Age 16. I.Q. Verbal 104; Non-verbal 100

> " Well it should do but it don't seem to nowadays, like there's still murders going on now, any minute now or something like that they get people don't care they might get away with it then they all try it and it might leak out one might tell his mates that he's killed someone it might leak out like it might get around he gets hung for it like that."
>
> Age 17. I.Q. Verbal 99; Non-verbal 126+
> (*From a transcript of a tape-recorded discussion*)

As there is a limited and rigid use of individual qualifiers, the adjectives and adverbs function as *social* counters through which the individual qualification will be made. This drastically reduces the verbal elaboration of the qualification which is given meaning by expressive signals. This does not mean that the gross number of adjectives and adverbs in speech samples taken from the two linguistic forms will differ very much but that the range will in one case be restricted. The qualifiers will be drawn from a lexicon *commonly* held, and (as it were) slotted into position, rather than being individually selected for a specific purpose. In this sense the qualification tends to be *impersonal*. Ongoing research tends to indicate that adjectives and adverbs used in *formal* language speech samples from subjects matched for age and very high non-verbal I.Q. with *public* language subjects, are only rarely not present in the active or passive vocabulary of the *public* language speakers. Feeling, then, is differentiated by referents which are the result of shared conditioning.

A *public* language is a vehicle for expressing and receiving concrete, global, descriptive relationships organised within a relatively low level of conceptualisation. The words and speech sequences refer to broad classes of contents rather than to progressive differentiation within a class. The reverse of this is also possible: a range of items within a class may be specified without knowledge of the concept which summarises the class. The categories referred to tend not to be broken down systematically and this has critical implications if the reference to be designated is a subjective state of the speaker. Despite the warmth and vitality, which is an expressive correlate of the language, it tends to be *impersonal* in the literal sense of that word. The original linguistic relationship between mother and child exerts no pressure on the child to make his experience explicit in a verbally differentiated way. It is perfectly possible, despite a restricted vocabulary, to create speech which fits individuated experience, but the orientation induced by this mode of communication does not make such characterisation appropriate.

The mode of speech, itself, will elicit and reinforce a special affective or emotional correlate. The speech delivery within a normal environment, outside the classroom,

tends to be composed of fast, fluent, short, relatively unpaused utterances. Affect (expressive signals) is not used to discriminate finely among meanings carried within a speech sequence; rather it is used to reinforce dominant words or phrases, or accompanies the utterance in a diffuse manner. The feelings of the child would seem to be, relatively, undifferentiated for two reasons. Feeling is not differentiated, stabilised and made specific by linkage through language to a wide range of referents. Secondly, feeling which is regulated by the speech is conditioned by the form of the language. It is a vehicle for expressing concrete, direct, activity-dominated verbal sequences. It reinforces a relationship of immediacy with the environment. The gap between feeling and doing may well be brief. It should be unnecessary to add this, but nothing that has been said should be taken to mean that the natural feelings of sympathy, generosity, kindliness and warmth are not to be found, equally present, in all social groups.

A *public* language focuses upon the inhibiting function of speech by directing attention (the attention of the observer) towards potential referents which carry no stimulus value for the speaker. In as much as a *public* language induces in the user a sensitivity towards the concrete here and now—towards the direct, immediate, the descriptive, the global—then the dimensions of relevance will tend to preclude responses to other patterns of stimuli. Thus an orientation towards a particular type of learning under particular conditions is also involved. An example of this inhibiting function would also illustrate the significance of the seventh characteristic of the language. It was suggested that there would be frequent use of statements in which the reason and conclusion are confounded-to produce a categoric sentence.

Imagine the following two conversations on a bus. A mother has a child sitting on her lap.

Mother: Hold on tight.
Child: Why?
Mother: Hold on tight.
Child: Why?
Mother: You'll fall.
Child: Why?
Mother: I told you to hold on tight, didn't I?

Mother: Hold on tightly, darling.
Child: Why?
Mother: If you don't you will be thrown forward and you'll fall.
Child: Why?
Mother: Because if the bus suddenly stops you'll jerk forward on to the seat in front.
Child: Why?
Mother: Now darling, hold on tightly and don't make such a fuss.

In the first example a whole range of potential learning and connections have been cut out by the categoric statement. The natural curiosity of the child has been blunted. There is no causal chain between the mother's request and the child's expected response. The change in the behaviour has been brought about by a process akin to verbal condi-

tioning rather than through instrumental learning. If the child challenges the statement then in a short period he is challenging the *right* of the mother to issue the request, that is, he is challenging the authority which inheres in the status of the mother. The potential social power in the form of the relation is revealed very quickly.

In the second example the child is exposed to an area of connection and sequence. If this is challenged then another set of reasons are elicited. Of course, after a time the categoric statement is applied but an order of learning has been made available in between. It should be noted that as the result of the linguistically elaborated relationship the initial challenges are of the reasons given to support the request. The challenge of the mother comes much *later* in the relationship and the latent social power is revealed later *and* under different conditions. If the categoric statement is used frequently in a *public* language then it limits learning and curiosity and induces a sensitivity towards a particular type of authority in which social power is quickly and nakedly revealed. The categoric statement becomes part of a language which narrows the range of stimuli to which the child responds. The length of this example also indicates how difficult it is to give concrete illustrations in a short paper.

An important psychological correlate of a *public* language is that it tends to discourage the experience of guilt. However, strong feelings of loyalty and responsibility to and for the local group will exist. Earlier it was suggested that the verbalising of subjective states, particularly of motivation, is not highly relevant. This implies that the referents of these states are not selectively reinforced by language. Koln has drawn attention to the fact that middle-class parents are more likely to respond in terms of the child's *intent* in acting as he does, whilst working-class parents are more likely to respond in terms of the *immediate* consequence. Thus the working-class parent is responsive to ends directed to inhibiting disobedient or disreputable acts, while the middle-class parent is responsive to intent and acts with reference to individualised standards. Simply, there is little *talking through* of acts which require disciplinary measures in working-class homes, little verbal investigation of motive.

The rational control and manipulation of induced guilt is a major means available to the middle-class mother for disciplining the child. These means reinforce the individualising process in the child and transfer attention from consequence, or result, to *intent;* from the act to the *processes* underlying the act. This is not the case for a child whose mother speaks a *public* language. In this case behaviour is more likely to be made subordinate to shame. Shame indicates a diminution of *respect* accorded to conduct by a group. It is psychologically different from guilt. Of course, the middle-class child is sensitive to feelings of shame; the point is that he is also sensitive to guilt.

A *public* language user will be aware that an act is wrong or that punishment is just, but feelings of guilt will tend to be divorced from the notion of wrongness. This would seem to make more likely the re-occurrence of the behaviour and to create a particular attitude to the punishment. It is not for one moment suggested that because motivational processes are verbally available to an individual, that these, in themselves, will always inhibit an action; only that the action would be accompanied by psychological states which might not be present if a child spoke a *public* language. There is a tendency for this to be recognised. Punishment of a *public* language user in a school will frequently

tend to be corporal, threatened or actual, because it is difficult to elicit a sense of guilt or a sense of personal involvement in the act. Though caning, etc., does exist in Public schools where a *formal* language is spoken, other methods are *also* used to modify behaviour. With a *formal* language user, punishment can involve a temporary rejection, or a talking through of the misdemeanour aimed at increasing the experience of guilt, responsibility and so of personal involvement. Attempts to interchange the means of social control may lead at first to many difficulties. This is *not* to be taken to mean that corporal punishment is necessarily an effective means of social control. Where it is used as a substitute for the real difficulty of making a social relationship, it is rarely effective.

This rather difficult argument has tried to make clear how learning may be conditioned where the only language of the child is *public*. In the learning of this linguistic form, the child is progressively oriented to a relatively low level of conceptualisation. It induces a lack of interest in processes, a preference to be aroused by, and to respond to, that which is immediately given, rather than responding to the implications of a matrix of relationships. Such an orientation partly conditions the intensity and extent of curiosity, as well as the mode of establishing relationships. In turn, this will affect what is learned and how it is learned and so influence future learning. There will be a tendency to accept and respond to an authority which inheres in the form of the social relationship rather than in reasoned principles. It fosters a form of social relationship which maximises identifications with the aims and principles of a local group rather than with the complex differentiated aims of the wider society. Finally and of the greatest importance, it is a language of implicit meaning in which it becomes progressively more difficult to make explicit, and to elaborate verbally, subjective intent.

This behaviour is all of one piece and is maintained as a relatively ' steady state ' by protective devices built into the language system. Perhaps the most important of these protective devices is that a *formal* language (as used, for example, by the teachers) will be mediated through the *public* language. In the process of mediation, any alternative orientation which would sensitise the listener to a different dimension of significance is neutralised. Where a translation cannot be made there is no communication. It tends to inhibit the verbal expression—and hence the learning attendent on such expression—of those experiences of separateness and difference which would isolate the speaker from his group. It channels cognitive and affective states which, if expressed, might constitute a potential threat to the equilibrium. For example, curiosity is limited and focused by the relatively low level of conceptualisation. The restricted planning function and the concern with the immediate, tend to make difficult the development of a reflective experience. There is a tendency, too, to shift responsibility from self to the environment and this further reinforces the rigidity of the behaviour.

Conclusion

It can be seen that attempts to change the system of spoken language of children from certain environments will meet with great resistance, passive and active. It is an attempt to change a pattern of learning, a system of orientation, which language originally elicited and progressively reinforced. To ask the pupil to use language differently, to qualify verbally his individual experience, to expand his vocabulary, to increase the

length of his verbal planning function, to generalise, to be sensitive to the implications of number, to order a verbally presented arithmetic problem, these requests when made to a *public* language user are very different from when they are made to a *formal* language user. For the latter it is a situation of linguistic development whilst for the former it is one of *linguistic change*. Two different psychological states underlie these situations. The *public* language speaker is called upon to make responses to which he is neither oriented nor sensitised. His natural responses are unacceptable. It is a bewildering, perplexing, isolated, and utterly defenceless position which ensures almost certain failure unless the teacher is very sensitive to the child's fundamental predicament.

This is by no means to say that a *public* language speaking pupil cannot learn. He can, but it tends to be mechanical learning and once the stimuli cease to be regularly reinforced there is a high probability of the pupil forgetting. In a sense, it is as if the learning never really gets inside to become integrated into pre-existing schemata. In fact, it looks as if this is so, for unlike the *formal* language oriented pupil, the *public* language pupil lacks these receptive schemata or if he possesses them they are weakly organised and are unstable.

The very conditions of the classroom situation often make effective education impossible. Large classes reduce the possibility of individual teaching, increase the probability of impersonal authoritarian methods of class control, which in turn increase the passivity of the pupil. If the teacher avoids this by small group techniques then, inevitably, he adds to his fatigue and in the long run may reduce his efficiency. There is a case for a general rule—the lower the status of the pupil, the smaller should be the number in the class. Expensive as this may seem at first sight, it might be economical in the long run. A small class is the basic condition for a close psychological relationship (inter-personal rather than inter-group) between teacher and pupil. The social organisation must enable the person, as well as the function, of the teacher to be felt and perceived. In an important sense, the teacher of a class of *public* language speakers is much more exposed, psychologically, if he is to teach efficiently. He cannot retreat into his formal role and impersonalise his communication. This does not mean that the appropriate teaching situation is one of all ' pals ' together. Nor does it require teachers who can ' speak the language.' In this respect there are only two types of teachers: those who can and those who cannot.

This is not the time to discuss techniques but perhaps it might be possible to seek agreement about the nature and ramifications of the educational problem. Although it appears very similar, the backwardness presented by the *public* language pupil is different in its dynamic form from that of the pupil whose backwardness is the result of psychological factors. It is a culturally induced backwardness transmitted and sustained through the effects of linguistic processing. The relationship, it is suggested, between potential and developed intelligence is mediated through a language system which encourages insensitivity to the *means* whereby the pupil's dimensions of relevance may be expanded and enhanced. It follows also that the condition progressively worsens over the years. As the educational process becomes more analytic and relatively abstract at the secondary level the discrepancy between what the pupil can do and what he is called upon to do is painfully revealed.

A *public* language speaker has at his disposal a vast range of potential responses. His behaviour is by no means standardised. The general cognitive impoverishment is an impoverishment only from the point of view of the educator and, of course, it deprives society of potential talent. However, it is a form of language which symbolises a tradition where the individual is treated as an end in himself, not as a means to a further end. It psychologically unites the speaker to his kin and, on a sociological level, to his group. It should not be under-valued. Under the most hopeful circumstances the educational process increases the risk of the speaker's alienation from his origins. The task would seem to be to preserve for the speaker the aesthetic and dignity which inheres in the language, its powerful forthrightness and vitality but to make available the possibilities inherent in a *formal* language. We must be very sure that the new dimensions of relevance made available do not also include the measuring of human worth on a scale of purely occupational achievement.

Bibliography

BERNSTEIN, B., (1958). "Some Sociological Determinants of Perception." *Brit J. Sociol.*, Vol. IX, 159-174.

BERNSTEIN, B., (1960). "Language and Social Class." *Brit. J. Sociol.*, Vol. XI, 271-276.

BERNSTEIN, B., (1961). "Social Class and Linguistic Development: a theory of social learning." In *Society, Economy and Education*, eds. J. Floud, A. H. Halsey and A. Anderson. The Free Press: Glencoe, Illinois (in press).

KOLN, M. L., (1959). "Social Class and Parental Authority." *Amer. Sociol. Rev.*, Vol. 24, 352-366.

KOLN, M. L., (1959). "Social Class and Parental Values." *Amer. J. Sociol.*, Vol. 64, 337-351.

LURIA, A. R. and YUDOVICH, Ia., (1959). *Speech and the Development of Mental Processes in the Child*. London: Staples. Press.

LURIA, A. R., (1961). *Speech and the Regulation of Behaviour*. London: Pergamon Press.

MCCARTHY, D., (1954). "Language Development in Children." In *Manual of Child Psychology*, ed. L. Carmichael. New York: Wiley and Sons. London: Chapman and Hall, Ltd.

MITCHELL, JR., J. V., (1956). "A comparison of the factorial structure of cognitive functions for a high and low status group." *J. Educ. Res.*, Vol. 47, 397-414.

NISBET, J. D., (1953). "Family Environment." *Occasional Papers on Eugenics*, No. 8. London Eugenics Society.

OPIE, I. and OPIE, P., (1959). *The Lore and Language of School-children*. Oxford: Clarendon Press.

VIGOTSKY, L. S., (1939). "Thought and Speech." *Psychiatry*, Vol. II, 29-54.

DULL AND BACKWARD CHILDREN: POST-WAR THEORY AND PRACTICE

by S. S. SEGAL
Riverway Secondary School, London

" Human nature could be changed," said Dr. Wall.*
" Intelligence could be changed. Environment could be changed and organised to create intelligence and personality. Change was the purpose of education."

* *Dr. W. D. Wall, Director, National Foundation for Educational Research in England and Wales. Reported in the ' Times Educational Supplement,'* 8/7/60.

Introduction

THERE are at present two distinct schools of thought about the nature of intellectual dullness, and the consequences which flow from each are markedly different. For the first, dullness is largely or entirely innate; it can be diagnosed with some confidence and the diagnosis is a prognosis. The child's optimum possible functioning and rate of progress can be gauged more or less from his I.Q. The ultimate goal of the teacher is that of helping the dull child to ' work to capacity ', i.e., to bring his attainments up to the level of his mental age. Beyond this we cannot greatly go.

For those who hold a different view, the result of an intelligence test gives a measure of present ' operational ability,' a compound of the result in general attainment of the interaction of education (formal and informal) and the child's native ability to learn. Though there are probably limits to what he can do, the teacher's task is to increase his pupil's all-round ' operational intelligence ' by improving not merely formal attainments but those mental skills which we recognise as general ability or intelligence.

Both schools of thought have authoritative and respected proponents. For the teacher, a study of the respective viewpoints is more than an academic exercise.

The Pre-War Situation

Our State education system, though still young, suffered from stern foster-parents in its earliest years. Less than a century has elapsed since a system known as ' payment by results ' was introduced for teachers in elementary schools. It was, of course, abandoned in practice, and Sir Cyril Burt proved that it had no theoretical basis. To him we owe the first systematic surveys of the nature and extent of backwardness in schools in this country—surveys which date back to 1913. From him we gained an analysis of ' the backward,' revealing the individual needs and characteristics of children who were backward and suggesting forms of organisation and treatment within the school system.

Our educational system was not alone in its problems, or in its proposed adaptations to meet them. Terman, in his *Measurement of Intelligence* (1919), pointed out that " between a third and half of school-children " in the U.S.A. were failing to progress through the grades at the expected rate; " from 10 to 15 per cent. are retarded two or more years " and " from 5 to 8 per cent. are retarded at least three years."

The scientific basis for a new approach had its roots in the work of Galton, the ' father of mental tests,' and of J. M. Cattell who coined the name ' mental tests ' in 1896. Binet, in France, devised a practical ladder of ability against which children could be measured, a ladder which was adapted by several countries to suit their requirements.

Hadow re-organisation here encouraged the formation of ' C ' streams and highlighted the problem of backwardness. Notwithstanding the over-sized classes, the 'thirties saw some notable efforts to make provision for some of the school failures. One of the better-known of these pioneering attempts to meet the situation was described by M. E. Highfield (then M. E. Hill) in *The Education of Backward Children*. Her Local Education Authority sought both to survey the nature and extent of the problem and to cater for the backward as units within the educational system. One of the conclusions reached was that, " 10 to 15 per cent. of the children in a re-organised school would be so retarded as to prevent them benefitting appreciably when educated in a ' C ' stream class." (p. 12).

Within the re-organised schools then, something more than a ' C ' stream was considered necessary for up to 15 per cent. of the school population in that authority. This confronted the L.E.A. with tasks beyond its immediate capacity.

Those responsible for educational provision felt, as the Director for Education expressed it, " like craftsmen attempting to work in a medium the composition of which they did not fully comprehend." More significant still, they were acutely aware of an emergency situation. " More than 50 per cent. of juvenile delinquents were school misfits: inside the school there was a distaste among the teaching staff for work with ' C ' stream classes."

In circumstances such as this, the theories and humane considerations put forward by Burt offered more than a chart and a charter; they went beyond what even the most progressive authorities were able or prepared to follow.

The specialists called in to suggest remedies were having to face an emergency situation. In this context it is understandable that one recommendation was, " that the individual scheme in reading and number shall form the basis for schemes of work for *small tutorial classes* accommodating no more than thirty children." Today it would be agreed that such schemes are likely to be ineffective in classes of more than 20 children.

Such was the size of classes in general and so haphazard and uneven the form of provision that the experiment at Southend-on-Sea stood out for teachers like the lights of Blackpool to their pupils. At this period, too, the theory implicit in much mental deficiency practice was that the mentally subnormal were in some way a different species, were ' sick,' ' peculiar,' and a matter for doctors rather than teachers. This attitude prevailed not only towards children who had suffered evident organic damage and were

in need of medical attention or constant supervision, but towards all children in Occupation Centres and Special Schools who were considered respectively ' trainable ' and ' educable.' It was rare to find explicit or implicit the concept that everything (apart from specifically physical medical treatment) which aims at improving a child's status as a functioning human being is, in fact, educational. The label ' mental defect ' was not merely incorrect but became a stigma. What is worse is that it tended to overflow to mark the category known as ' the dull and backward.'

By 1937, at least 51 Local Education Authorities had introduced special classes in some form, occasionally restricted to 20 pupils in the class. It is difficult to be sure precisely of the intellectual status of the children in these classes. These initiatives, however, convinced a Committee of Inspectors in 1937 that " where small special classes appropriately staffed " had been tried, it could be stated " with conviction that the chief gain to the children had been an improvement in outlook, a moral and social gain."

In general theory and by and large in practice, Burt's definition of the dull and backward child had been generally accepted. A dull child was one whose intelligence quotient fell below 85; and the feeble minded or mentally defective were those below 70. In practice, however, no special move appears to have been made to select dull, and therefore backward, children for special or separate treatment and experiment. It was assumed that the ' feeble-minded ' (I.Q.s 50-70) were in Special (M.D.) Schools, and Special Classes, where they existed, were assumed to have children who ranged upward in I.Q. from 70. However, the Board of Education, in 1937, drew attention to the fact that the normal school pattern was often complicated by the presence in ordinary classes of ' certifiable ' children.

In most areas the *dull and backward* as defined by Burt, were to be found in classes which included all the degrees and kinds of backwardness then recognised, ranging from the child of normal general ability who was behind in school work (i.e., had an educational quotient below 85) to the ' feeble-minded '—and included pupils whose principal problems were behavioural or emotional.

To this confused situation must be added the complicating factor that few teachers of the backward were trained in techniques of infant or remedial education, in psychological and educational diagnosis, or could successfully adapt what they did know to the social, emotional, physical or intellectual levels and needs of the different age groups. In such circumstances the general pattern of practice could hardly be considered to have shown what could be done with and for such children. Nor, indeed, had existing theory been utilised in practice to the limits of its usefulness.

The Dull and Backward—a shifting Concept

The 1944 Education Act provided new opportunities from the points of view of provision and practice. It was accompanied by a shift in theory, a shift of emphasis if not of substance. In practice a more subtle and flexible approach became possible and the changing concepts led many teachers and research workers to develop and change their practices if not the actual statement of their theories.

The recognition that equality of opportunity really implied further differentiation of provision, gave rise to definitions of ten categories of handicapped children who needed special arrangements for their education. It became the duty of each L.E.A. to ascertain precisely how many pupils came within each of these ten categories and to make special educational provision accordingly. The largest of these categories was virtually a new one: *the Educationally Subnormal.*

A child was considered to be educationally subnormal if his *attainments* did not exceed 80 per cent. of the attainments of an average child his age. This applied irrespective of the assumed causes of such backwardness and whether or not it was considered remediable. The Educational Quotient had come into a new prominence and the school system was pledged to tackle this substantial area of backwardness as a special problem.

This definition did not extend to children excluded from the school system as *ineducable* (and therefore the responsibility of the Health Authority); and it was thought to include some 10 per cent. of the entire school population.

In 1946 the Ministry estimated that about 12% of these ESN pupils in urban areas would require special ESN schools. The size of this fraction suggests that the concept guiding the Ministry had much in common with the pre-war concept of ' feeble-minded.' " Past experience suggests that children cannot be educated at school when their intelligence quotient is below about 55." Similarly, " a child with an intelligence quotient of more than 75 should rarely find his way there " (i.e., to the Special School) " as his recuperative powers are so much greater than those of the majority of pupils in special schools."

In urban areas, then, the *dull and backward* would be incorporated in a broad band of ESN children whose I.Q.s exceeded about 70 and who were, therefore, not considered to need special placement, except in rare cases. However, unless the pupil was at least 20% behind average in his attainment, he was not ESN. If we compare this with the I.Q. range 70-85 for dull and backward it can be seen that, theoretically at least, a substantial minority of those formerly thought dull and backward and in need of special programmes were to be omitted from the new category ESN. Such children (i.e. those with I.Q.s above 80 and E.Q.s to match) are today absorbed within normal school provision. The L.E.A., however, was now duty-bound to make special educational treatment available for all ESN children (other than the ' feeble-minded ') within the ordinary school or in additional special schools.

Practical and Theoretical Consequences of Provision

The new situation should be seen in perspective, with the substantial changes in physical provision viewed against the background of the need. The population of special ESN schools trebled between 1946 and the beginning of 1960 (from 11,000 to 33,000 pupils). A serious effort was made to train teachers for the task. At the University of Birmingham the Diploma in Child Psychology begun by Valentine before the war was revived in 1945. This provided a general training in applied educational psychology with emphasis, in the training and research programmes, on educational failure with

otherwise normal ability. The course was not specifically for teachers in special ESN schools or for those working with 'dull' children, although it provided a thorough training in educational diagnosis and remedial work. In 1950 the first course specifically intended for teachers of handicapped (ESN) pupils was begun at the Institute of Education, London. This one-year, full-time advanced course for experienced teachers was followed in 1954 by a similar course in Birmingham. By 1960 there were a further eleven courses of a year's duration considered suitable for teachers of ESN children, but altogether they barely provide sufficient teachers to replace the expected annual loss from special schools alone. This growing but proportionally small band of specialised teachers is doing much to leaven the increasing number of teachers without special training entering our trebled special schools.

The situation in the schools themselves is not static. In 1956 the Ministry, following upon changing estimates of the need, urged Local Education Authorities to make a more comprehensive survey. As a result, the Ministry concluded that 52,000 places in special schools were required today, i.e., 0·8% of the school population and 19,000 more places than yet exist.

If we accept these figures, it seems that two-thirds of the children thought to need special school placement are now placed. It is, however, questionable whether these figures do reveal the full extent of the need for the kind of treatment provided in special schools. A number of variables are clearly involved and include the nature and flexibility of the school system in each local authority. The less flexible the system the more special provision is necessary outside the normal run for those who cannot adapt. Other variables immediately suggest themselves.

The Ministry's estimate of the current need might more effectively react upon theory if we could be sure that it is comprehensive—if only in urban areas. Comparison then with the Wood report (1929), for example, might be fruitful. Dr. E. O. Lewis found that 1·8% of the school population in urban areas had I.Q.s between 50 and 70. Had this proportion decreased by 1956—and if not, what is happening to those children not in special ESN schools? Is the I.Q. proving a less important factor in assessing whether special school provision is necessary for a given child, and if so what other factors are being taken into account? What new forms of diagnosis and prognosis have evolved *in practice*? How, in fact, do children within the 50-70 I.Q. band who remain in normal schools compare with children thought suitable for special schools?

At the time of the Lewis report there were 33,000 children who had been ascertained for special schools and the Board of Education was convinced that this ascertainment was "far from complete." Sir Cyril Burt and the Scottish Council for Educational Research found that about 1·5 per cent. of the urban school population come within the band requiring the kind of treatment expected in special ESN schools.

The most recent estimates of the need for special ESN school places are, therefore, perplexing, and all the more so when one discovers that something like a third of the special ESN school population falls outside the 50-70 I.Q. band and ranges from a few with I.Q.s below 50 to a substantial group with I.Q.s above 70.

It would be gratifying to think that there had been a shrinkage in the proportion of children within the 50-70 I.Q. band. It would be equally encouraging to believe that

the ordinary school was more and more proving capable of absorbing and educating a growing proportion of these children. Experience in both special and ordinary schools however, discourages us from drawing such conclusions from any such comparisons with pre-war estimates. Special schools vary from locality to locality (and even within the one locality) in the range of children they accept. The obstacles to making an objective estimate of the need today are numerous, if often obscure. A case in point is indicated by recent research carried out by the Department of Social and Preventive Medicine, University of Manchester, into such an element as ' social selection ' at each stage of the ascertaining process, from (*a*) the rate of referral from schools of different kinds; and (*b*) the subsequent decisions by the School Medical Officer; to (*c*) children subsequently admitted to institutions. Susser found, from a follow-up study of educationally subnormal children, that it was possible to show that the cultural characteristics of a family " were very significant in determining whether or not they would be selected as part of a sample of ascertained educationally subnormal." It is equally evident that parental opposition, though undoubtedly diminishing, still varies from area to area and plays a role in discouraging special school placement.

How far Local Authorities have tried to meet this opposition by devising other forms of special provision rather than sacrificing the child is not known. An interesting experiment which might merit closer study in this respect, is that in Great Yarmouth, where special classes within the ordinary school have been organised—such classes being limited to between 8 and 15 pupils who have been ascertained as ESN.

In today's situation, then, we are left to conjecture how far normal schools are still having to cope with children within the 50-70 I.Q. range, and how far such children prove *able to hold their own and progress* within the normal school; how far is low measured general ability relevant by itself and how far other factors determine success.

If for convenience we distinguish the special school group much in the old way from the dull and backward, who might well be educated in the ordinary school, then there are a number of further questions to be asked. We need to know, for example, how children who are *dull and backward* but form a sizeable proportion of the population of many special schools, respond to such placement and treatment; and how the results of such provision compare with the progress made by a matched group of dull and backward children in the ordinary school.

There is certainly a case for comparing matched groups of dull and backward children at both the primary and the secondary stage in good special schools and good remedial departments (or classes) in ordinary schools.

We have little objective information to guide us here. One recent research by Stein suggests that " special school education has made a significant contribution to literacy in children with intelligence quotients under 70; those with intelligence quotients over 70 had usually attained literacy whether or no they had special education. In arithmetic, children with I.Q.s over 65 who are yet within the educationally subnormal range are helped to attain numeracy by special education which they may not attain if they do not have such education."

Specific research with the dull and backward is difficult to find. One investigation which is mentioned elsewhere in this article has some relevance here. " In an extensive

case-study search for ' just dull ' children " Stott found, as well as a low level of ability " at least one feasible reason . . . for the backwardness " and concluded that " it is doubtful if such ' just dull ' children exist."

There is thus doubt as to both the extent and the nature of the problem of ' dullness ' as well as to the kind of provision required and the possible changes which might be effected by ' special educational treatment.' Even if we reduce the upper limit of the dull from an I.Q. of 85 to one of 80 (to match the upper E.Q. proposed by the Ministry for the ESN), we would still have to recognise that practice, as before the war, is influenced as much by provision as by theory. The area of doubt can be expected to remain until a substantial number of primary and secondary schools (of ' modern ' type) have at least one suitably qualified teacher of ESN children, a need recognised in the 1954 Report of the Advisory Committee on the Supply and Training of Teachers of Handicapped Pupils. At the present rate of teacher-training, the minimum number, suggested by the Advisory Committee, of 10,000 teachers required would take more than half a century to provide.

Shifts from the Theories Guiding Pamphlet No. 5

The proposals in the Ministry's pamphlet on Special Education (1946) were made within certain theoretical concepts. ' Intelligence ' is regarded as fixed and probably innate. " It is a matter of general agreement that intelligence cannot be substantially improved by any methods known to us at present, and that aptitudes verbal or practical are not readily alterable except, perhaps, by skilled teaching over a long period. Retardation due to limited ability is not likely to be quickly or easily overcome even by the best forms of special educational treatment, and where the limitation is in general intelligence, the retardation is unfortunately likely to be permanent."

The concept of ' mental age ' proved invaluable, in suggesting an organisational framework, stressing individual differences among children of the same chronological age, providing a starting point for treatment and indicating the apparent rate of maturation and school progress to be expected.

With *literacy* having been defined as reading age of 9 plus, it tended to be accepted that a dull and backward child with an I.Q. of no more than 70 might under favourable circumstances attain literacy before his thirteenth birthday—assuming that no specific handicap prevented this. Even a child of much lower ability (e.g., an I.Q. of 60) might achieve literacy by the age of 15 (a year before statutory leaving age in special schools). This theory discouraged helplessness or ' baby-minding ' on the part of the education system and encouraged experiment.

At first, research seemed to emphasise the constancy of the I.Q. and the tendency for it to decline earlier amongst dull children. Wider application of tests and new generally acceptable evidence modified such theories. By 1951 the shifting view-point is evident in such cautious departures from pre-war axioms as were evidenced in the revised version of M. E. Highfield's book. She now states that, " In the early days of group intelligence testing, there was a tendency to accept the results uncritically as predictive of the child's capacity to learn. However, it became apparent as discrepancies multiplied that the I.Q. could prophesy falsely."

There was no longer the statement, formerly in italics, which had guided many teachers, " a measure of the child's intelligence or innate capacity to learn should set the ideal standard of attainment for that child." There was nevertheless reference to " considerable statistical evidence " which showed that " for the vast majority of children the I.Q. fluctuated very little and that it is a reliable predictive measure, at least over a period of two or three years."

Few today would challenge this conclusion although its relevance could now be debated. As the I.Q.s had been estimated from different age groups whose environments alter little in " two or three years " there could be little reason to expect significant rises in I.Q. for the majority of the school population over a short period. Such a conclusion might be of value to the administrator but offered no illumination for special educational treatment. Far more important is a study of why the minority change and change markedly. Vernon suggests that some of our pessimism about the modifiability of the I.Q. may be due to the nature of the measures used—" our current intelligence tests make no attempt to measure modifiability or learning capacity as such." He also emphasises that ' intelligence ' operates in a context of personality, and especially in a framework of motivation and learned behaviour—" it seems curious that many people whom we would regard as intelligent, and who do quite well on our tests, are in fact not very well adapted to the physical and social environment in which they live."

We have some evidence which cannot be ignored that the *constancy* of the I.Q.—even allowing for a margin of error in testing and fluctuation in the functions measured—breaks down when individual intelligence tests are given to children in Special ESN Schools. Frances Lloyd for example, not only records some dramatic changes in I. Q. in her school (changes which she attributes to wrong diagnosis or to a failure to detect emotional difficulties—as with one child who leapt from being within the ' ineducable ' range, I.Q. 45, to beyond the range for special schools, I.Q. 89) but shows, in figures quoted by Child, that 24% of her pupils had made a steady and significant gain in I.Q., 19% a steady fall, and 50% showed an irregular pattern of I.Q. development.

In a recent study by the writer, where the I.Q.s of 72 Secondary ESN Boys had been recorded over a period ranging from two to nine years of schooling, 75% fluctuated more than 5 points, 41% more than 10 points, 20% more than 15 points and 5½% more than 20 points. This, it should be emphasised, was on individual tests by trained testers. Sadler, another headmaster of an ESN school, revealed equally substantial changes in an unpublished thesis. His pupils altered in I.Q. within a range of minus 13 points to plus 26. In a subsequent analysis of the situation in his school, Sadler found that where the pupil's condition was complicated by remediable factors affecting sight or hearing, or by social and emotional factors, the greatest changes could be affected in I.Q. if the child on entry had an I.Q. of 70 plus. With this group he records an *average* increase of 8 points. No similar rise was found where the pupil appeared to have an uncomplicated background, i.e., had a good home, was in good physical or sensory condition and did not appear to be emotionally disturbed.

In practice, such shifts in I.Q. on the tests used in Ascertainment procedures, could re-classify a significantly large group of children according to the importance attached to the I.Q. and the year in which the I.Q. was measured. Such fluctuations in I.Q.

challenge inflexible administrative procedures, irrespective of whether or not *intelligence* is considered to be improvable. Whilst it may not harm a child to be wrongly classified as suitable for a special school (and may do him a considerable amount of good) moral as well as educational issues become involved if we exclude a child from schooling partly or mainly on the basis of his I.Q. Such considerations have led the Ministry to suggest that before a decision is made a satisfactory trial period for those bordering on the 'ineducable' should be given in special schools or in units where special educational provision is made. Equally it should be urged that a satisfactory trial should be given to children whose dullness is such that transfer to special school provision *may* prove necessary, in ordinary schools where special provision is made for dull and backward pupils.

It is now generally recognised that although apparently rigid classifications may be necessary for administrative reasons, they do not square necessarily with educational potential or with theory. Similarly, we know that the same numerical I.Q. in two children of the same chronological age may obscure a very wide range of individual differences and educational possibilities. Awareness of this *in practice* has resulted in more experiment and greater variations in provision than are sometimes realised. A recent survey by the Guild of Teachers of Backward Children revealed a significant *interchange* of pupils between Training Centres and Special Schools on the one hand and between the latter and ordinary schools on the other. The special school population not only shades into the dull and backward within the ordinary school, but overlaps more broadly than is generally realised. In part, this overlapping may be responsible for the pressure by some parents to have the statutory leaving age in the special school reduced to that of the normal school. Where the pupil's intellectual equals 'down the road' are leaving school at 15 and earning money, it is difficult to convince some parents that the school is other than a further restrictive influence imposed upon them by a hostile society. This may in part explain the regular practice in some special schools of *de-ascertaining* selected children at the age of 15 and enabling them to leave to go to work. Against this, it must also be noted that some parents of less able children are prepared to let them remain at school beyond 16, and it is worth recalling that the special school is permitted to retain such pupils until the age of 19.

Those concerned with the ESN would agree that there is a need for a regular review of each case of dullness, a review which already takes place in special schools but cannot always be matched by appropriate placement or transfer of the child. Change to an ordinary school, for example, poses the question, "*which* ordinary school is able to help *this* pupil?" Change *within* an ordinary, streamed school may be obstructed by the size of classes and the need to *demote* a pupil to balance any promotion. A non-streamed school may have advantages here which must be contrasted with the disadvantages inherent in a situation which, because of class size, may make *special* provision impossible. 'Placement' of a child involves a plurality of factors requiring consideration quite apart from I.Q. or mental age.

Selection of the dull and backward

It is interesting to note that a variety of forms of practice have evolved in different countries from similar theoretical bases. The countries which met for the annual con-

ference of the International Bureau of Education at Geneva in 1960 put forward classifications of ' educable mental defectives ' which would in some cases incorporate those we have defined as dull and backward. One group of countries (our own, along with some Commonwealth countries, China, France, Sweden, Israel, Japan and Thailand) provides special schools for children within the 45/50-75 I.Q. range. The lower I.Q. floors in some countries indicate how arbitrary the lines of demarcation are. A second group distinguishes between the 50-70 I.Q. range who go to special schools and the 70-80 I.Q. range who attend Special Classes (Norway and the Phillipines). A third group widens the band of special school children to the 50-80 range (Australia, Argentina and El Salvador) or even the 45-90 range (some cantons of Switzerland). A fourth group considers the 45-60 I.Q. range equivalent to the imbecile category (Netherlands) or merely caters in special schools for children with I.Q.s of 65-85 (German Federal Republic). There is a fifth group which falls outside the above in not using intelligence tests at all (U.S.S.R., Hungary, Ukraine, Byelorussia, Rumania) or in using them only as ' an auxiliary criterion ' (Czechoslovakia).

There is however, as the countries of the I.B.E. report note, a marked shift away from the use of the I.Q. as a sole or even the predominant element in the decision to place a child in a special school or class. The conference did however tacitly retain the word ' mental *defect*' with its implication of aberration or even an organic basis for mental subnormality—and this in face of the proposals of an expert international group called together by W.H.O. and Unesco in 1954. The report of this group stresses both the possible modifiability of the level of intellectual functioning and the demonstrable fact that most mentally or educationally subnormal children are in no sense *defective.*

Practice as reflected by the I.B.E. report, then, lags somewhat behind even the theoretical position of a decade or so ago. It has hardly begun to consider such evidence as that put forward by Stott in his James Wykeham experiment. He suggests that there is no quick and easy way of sorting out those children who require long-term, all-round treatment from those likely to respond quickly to suitable remedial measures. In his experience, only the child's actual progress within the remedial setting and under skilled guidance can decide this. Doubts regarding the predictive value of the I.Q. have led such psychologists as Kellmer Pringle to criticise the training of teachers in intelligence testing as such and to urge that tests should be used for the qualities of mind they reveal, i.e., diagnostically rather than prognostically. Such diagnosis coupled with practical suggestions to the teacher might well result in a new break-through in educational diagnosis and techniques. It might well, too, lead to a generalising of improvement in I.Q. reflecting a general improvement in intellectual functioning.

It is interesting to note that Binet's work is increasingly quoted today from a new angle—from the emphasis he placed on the educability of the I.Q. and the programme he evolved called ' mental orthopaedics.' It is significant that the U.S.A. has now produced a differential diagnostic test which seeks to reveal specific weaknesses in the communication process. The Illinois Tests of Language Ability for children aged two to nine years, attempt to diagnose defects or deficits in the three processes, ' decoding,' ' encoding ' and ' association '; within two channels, auditory and visual on the receptive

side and vocal and motor on the expressive side; and at two levels of organisation, the 'representational' and the 'automatic-sequential.' The next stage of this programme is to devise remedial programmes for each of these defects or deficits.

It seems that the move is away from the somewhat pessimistic view that measured intelligence represents a limited potential towards a more optimistic view that carefully devised education based on close analytic study of the present level of a child's ability may well do something to remedy his handicaps.

Limitations of Current Theory

Criticisms of provision do not necessarily carry with them criticism of the theory implicit in that provision. Nevertheless, the strongest criticism of current practice is directed at a consequence of current theory, its weakness in relationship to the pre-school child and the infant. M. E. Highfield, for example, in her chapter on the Infant School Special Class, was guided by specific interpretations of the concept of 'mental age' and 'maturation.' She wrote, "It is clear why a dull child should be retarded—simply because his thought processes are at too immature a stage of development to enable him to assimilate the material of formal training in number and reading . . . In extreme cases he may be a defective whose mental age when he enters school at 5 years of age will be 3 years. No more can be expected of him than is demanded from a child in the younger section of a nursery school. It is a waste of time and injurious to the child to attempt a formal training in such cases."

This view would have been generally acceptable before the war. Today it is increasingly criticised as encouraging 'waiting' for suitable maturation. In some countries this concept has resulted in children being excluded from nurseries and infant schools to await maturation. "This practice," says Kirk, "assumes that kindergartens do not aid the mental and social maturation . . . and that the cultural influences of the home are not important factors in mental development."

In this respect current theory requires the closest examination. Many experts in the field would agree on the lasting and possibly determinate importance of educational influences brought to bear on the child under the age of seven.

Research outside the educational system may provide our greatest stimulus here. Not only has there been a break-through in chromosome investigations and in biochemical genetics but also in educational psychology and training programmes. Mundy was able to prepare a number of children for acceptance in a Special School, whereas, without her programme, they might still have been considered 'ineducable.' A hypothesis by Hebb, that transfer of training would be inversely correlated with age, was tested. This prediction was strongly confirmed by Clarke and Blackmore who state "that early training enables the institutionalised imbecile to achieve levels more characteristic of older imbecile children or adults, and to show greater relative profit from experience." Clarke found that "traditional clinical opinion which has emphasised what the imbecile cannot do, is correct only in so far as short-term observation, or very short periods of training are concerned. Limitations on learning, though considerable, are by no means as profound as had hitherto been supposed." Slomson found that "the possibility of the

successful teaching of reading and allied skills to children who produce I.Q.s of 45-55 on standardised tests, depends to a large extent on stable emotional behaviour."

The new trend within the ' ineducable ' sector of the population is creating changes in the form as well as the content of training. As Hilliard puts it challengingly in a post-war textbook on Mental Deficiency, " mental deficiency practice is tied to outdated procedures whose aim is to segregate the defective from the community rather than integrate him with it." The new direction is evidenced in such work as that of O'Connor and Tizard who demonstrated that with suitable motivation and training, it was possible " in a period of full employment " both to employ imbeciles and to make such employment of economic as well as therapeutic value.

The influence of unusual environments upon the I.Q. had already been demonstrated (e.g., negroes in the north of the U.S.A. compared with whites in the south). The demonstrated influence which a change in environment (e.g., placement in foster homes), adverse experiences and schooling have upon tested ability has modified rigid concepts of the I.Q. Similarly the Scottish surveys and Cattell's two surveys (1950 and 1957) of Leicester children confirm what is now common experience in the 11+ examinations—there is a small but significant rise in mean I.Q. on the same test given to otherwise similar groups of children separated by a generation or so. In considering this last piece of evidence we must of course bear in mind the suggestion that ' test wiseness ' accounts for some of the improvement, but this cannot be the whole explanation now that the school population has for some years been exposed to tests. It is reasonable to conclude that the change in general environment of the schools and of the homes is having an effect.

Kirk, summarising a study of the effects of early educational procedures on the child, found that children from under-privileged homes tended to stay at the same rate of development or drop in rate as they grew older but that this was reversed if pre-school education was given—the majority increasing their rate. When given pre-school education, all increased in rate of development. With institutionalised children, those who had had pre-school education tended to increase in rate of development whilst those remaining in the wards tended to drop in rate of development as they grew older. He concluded that the rate of mental development, particularly with non-organic mental defectives, was partially dependent upon early environment including school experience. It suggested a strong socio-cultural element in growth in addition to a purely genetic one.

Stein suggests that the nature of the family background of values is of similar importance. He differentiates among the educationally subnormal according to whether they come from ' aspirant ' or ' demotic ' families. In the first group some organic lesion can be expected whilst in the second group there will be cultural deprivation rather than (or in addition to) organic lesion. He found that the organic cases showed little change other than a possible deterioration as they matured, whilst the culturally deprived children could be significantly improved. Stott doubted if " ' just dull ' children exist." He considered that, "The subcultural group which Lewis (1933) postulated, meaning those individuals whose mental ability does not come up to the level needed for managing within a particular culture, really amounts to an aetiological dustbin into which all those are put for whom no organic or ' pathological ' reason for their mental disability can be found . . . "

Nor is progress limited to non-organic causes. Gellner, for example, posing a neurophysiological concept of mental retardation, devised differential tests for four major kinds of mental handicap and outlined educational programmes for each.

Here then is a substantial challenge to former interpretations of ' maturation,' and it opens new possibilities for the educator.

For the teacher, the concept of maturation requires to be at least matched by the concept of motivation. It is now accepted that the provision of a suitable and stimulating environment can transform a number of children once diagnosed as feeble-minded into reasonably capable adults. Former concepts of the constancy of the I.Q. are equally challenged by Stott's finding that motivational impairment is often made good at puberty. " Boys ineducable until, say, fourteen, acquire the confidence and wish to learn . . . "

Research into motivation has brought out more richly the concept of 'the whole child', a nurture-nature synthesis or interaction, a growing up which interpenetrates with a series of environments, each of which is in part absorbed and all of which are subject to change. There is today a general acceptance of the importance to the teacher of an understanding of child development, of a recognition of the influence of groups, of inner drives and suitable incentives likely to evoke required responses. As Wall has put it, " It would seem that the teacher's task is to accept the declared interests and curiosity of his pupils as a starting point and indeed to use them as far as possible all along the way. At the same time however, he must so arrange the environment that one interest provokes another and that the feeding of interest or the satisfaction of curiosity are made sufficiently easy so that the child can with reasonable effort experience success fairly continuously."

With evidence of this kind drawn from research which ranges from the pre-school to adult years and from the severely handicapped to the normal, there is a clear need to ask ourselves how far practice is still ' tied to out-dated procedures,' how far pessimistically determinist theory retards progress, how far we are making children fit the provision and our estimates of possibilities.

The ' hard core ' of dull and backward

Whilst the I.Q. has been shown to rise under certain suitable conditions and whilst educationists (e.g., Oliver, by means of a concentrated programme of physical conditioning) have shown such rises to be in the nature of a by-product, little has so far been said on the *nature* of that *intelligence* which we measure by tests. There is clearly a need to study in detail and consider the consequences of current research. A series of researches in progress in Israel, reported by Smilansky, reveals a direct frontal attack on the problem of raising ' intelligence.' He and his colleagues accept that the kinds of relational thinking which are measured by intelligence tests can and should be deliberately developed by educational means—especially in those children whose environment is culturally impoverished. This does not mean direct coaching in intelligence tests as such. It means impregnating the education of these children with the kind of processes tested (which *may* be related to the kinds of process tapped by the Illinois Language Development Tests or those which Piaget has not merely described but found to be educable).

The teacher needs to be aware of these exciting new developments—and of the further changes in technique and aim which they prophesy. More experiment must come from the classroom.

Some tentative conclusions

The pre-war concept of *dull and backward* has been considerably modified as a result of closer work with, and study of, the problem. The notion that dullness is for the most part irremediable and the definition of the dull and backward as coming within the 70-85 I.Q. range cannot be accepted today without considerable qualification. A new definition or hypothesis is necessary to match the results of current practice and thinking. An educational assessment is less controversial and more fruitful and involves no departure from the current concept of *educational subnormality*. Meanwhile, the following practical steps suggest themselves:

1. Those we consider to be ' dull and backward ' or slow developers require carefully planned educational provision beginning as early in life as possible. Pre-school provision, particularly for children from economically or culturally deprived homes offers substantial promise. This entails opening kindergartens, nursery classes and nursery schools, notably in such areas as would have been painted black on Sir Cyril Burt's map of backwardness (or Booth's map of crime) had it been extended to cover the country.

2. All children who appear dull or slow should be examined at as early a stage as possible by an educational psychologist well acquainted with the field and, if need be, special nurseries should be set up. (Something more is envisaged here than the special clinics for children who are mentally handicapped.) These would seek, in co-operation with medical and other experts, to minimise the effects of physical and other obstacles to maturation and extend the child's experiences to increase his readiness for the next stage of growth.

3. In the general, initial training of teachers, more attention should be paid to the study of motivation and of maturation in young and in dull children. It is probable that Piaget's concepts of stages and sequences can be helpful here (as envisaged by Woodward) in assessing the stage reached by a child and in aiding him to proceed to the next stage. The notion that one should patiently await maturation might well give way to the idea that maturation can be accelerated—cautiously so that no attempt is made to proceed faster than the child seems temperamentally able to go.

4. There is an urgent need for a *differential* diagnostic test to supplement or replace the more or less global ones in use now. Such a test would attempt to differentiate levels of functioning, distinguish so far as possible discrete aspects of the interaction between the child and his environment, and at least describe in operational terms the effects of any organic defects which remedial treatment may be able to by-pass, to influence or to take into consideration in the teaching programme.

5. At the infant stage the careful development of adequate *motivation* of the child rather than the requirements of the normal infant school may have to be a central

requirement although it is apparent that many children now thought to be in need of special schooling, may prove able to enter the normal school whilst many who might be loosely classified as ' dull and backward ' should prove able to enter the average group. Where necessary, it should be possible to retain the child in the special nursery beyond the ' normal ' leaving or transfer stage, and then place him in a suitable infant school able to take him a further stage.

Within the primary school, even if I.Q. is still used as a broad classifying criterion, organisation must be flexible to allow us to correct errors in diagnosis, to deal with unequal development, and with different rates of maturation at each stage. The traditional practice of giving priority to the setting up of special classes in senior or secondary schools requires to be reversed. It is rather like shutting the stable door after the horse has escaped and is a practice without theoretical support.

6. The importance of language development in the growth of intellectual development and of numeracy in social adequacy makes it imperative that basic subjects (related to outside realities) are seen as basic. The accusation of ' baby-minding ' laid against many special schools and classes abroad derives from the practice of withdrawing troublesome children amongst others from the normal oversized classes rather than selecting children with a view to aiding their growth. Treatment of the apparently ' dull and backward ' at the primary school stage depends in great measure on the head teacher's policy and the organisation he sets up. The merits and otherwise of *streaming*, for example, are largely argued on ' social ' grounds. Streamed and unstreamed schools can prove negative influences on the educationally subnormal child unless the latter's needs are specifically considered and there is a social climate which accepts him as part of the school. This climate is partly dependent on the attitudes of the children with whom the ESN child plays and works. But it depends also upon the attitude of the head and staff. ' Streaming' is still an issue which splits teachers into two camps. In practice however, partisans of either may neglect the *duller* children and sometimes use doubtful theoretical arguments to justify this rather than frankly criticise provision, teacher-training or teaching skill. For example, one head teacher with strong views about the social and religious value of non-streaming and with substantial achievements in the educational attainments of a majority of his pupils, wrote, " About subject teaching, arithmetic, with its progression and its relationship to specific ability and maturation, is the only subject which can offer difficulty in an unstreamed class . . . I advise the teacher not to devote much time to the very dull children with little or no number sense. It's a waste of time—and God always gives these dull ones a sense of money values, so why worry?"

Teachers who face older pupils and young adults who were never helped to overcome their weaknesses in number would challenge this view, although they could appreciate the circumstances which probably drove this headmaster to express it. A disability with number can prove crippling to the personality and such adults can easily become a prey to undesirables—notably where money is involved. At the primary stage—if the child is later to fit into the community without feeling an

outcast or being discouraged from making relationships which aid maturation and personality—specialist attention must be available for every child who is failing generally or specifically in basic subjects. The recommendations of the Advisory Committee on the Supply and Training of Teachers for Handicapped Pupils, are a minimum requirement. One specialist in Educational Subnormality should be on the staff of every primary school.

7. Within the secondary modern and comprehensive schools remedial departments have already demonstrated the value of selecting ESN pupils for special treatment and allowing policy to be sufficiently flexible for those pupils who progress adequately, to be returned to the body of the school. For the less responsive or disturbed, specialist advice should be available along with ancillary provision such as now exists in some areas for primary-school age children. It is interesting to note, for example, the results of such experimental provision as that described by Stott (James Wykeham experiment) or in a variety of ' adjustment ' classes (e.g., Exeter and others). Within a larger authority (e.g., the L.C.C.) it has been possible to provide different forms of special class at the primary stage ranging from ' remedial ' classes, suitably staffed, for bright or average boys who are backward at school, to ' tutorial ' classes for children whose problems are primarily behavioural.

8. A particular weakness of current practice is that a pupil may leave school at 15 (or 16 in a special school) irrespective of his attainments and possibly just at the point when he begins to see a need for learning and is ready to respond. There is a case for a kind of work and study programme to be organised The Bureau for Children with Retarded Mental Development has in New York City, a progressive arrangement with some employers whereby selected children go to school part-time and to work part-time on a graduated scale, the teacher visiting the more backward whilst they are on the job and planning school work on the basis of the extra information and skills the youth requires for his job.

The weakness of provision at the end of the compulsory school period is evident in the lack of reading material for backward youths and the make-shift arrangements to which teachers have to turn in Evening Classes for backward youths (where they exist) and similar centres. The case for prolonging schooling for those with genuine learning difficulties of a general kind is strong. Much might be done even with adolescents and young adults had we the differential tests which revealed the nature and extent of the difficulties and experimentally devised programmes to remedy remediable difficulties. It is probable too that more of such young people would stay on at school were grants available to cover in part the loss of earnings.

9. Research has already revealed something of the influence of pupils upon each other and of teachers' personalities upon the class. We are however a long way from the attempt to work out at each stage or level precisely what we should teach or what processes are required to help maturation, and the best ways of preparing material for the apparently dull child. There is a need for a continuing guidance of

those who have entered on their working life, a case study based on the concept that growth is not a smooth upward curve and that a skilful and timely enrichment of the educational environment may genuinely raise the operational effectiveness, the genuine ability, of many if not all of the dull.

We cannot say what are the limits of a given child's capacity until suitable efforts are made to try to help him attain them.

References

ALFORD, A. F., 1959. "The Importance of early ascertainment of educational subnormality." *Forward Trends*, Vol. 4, 6—9.

BOARD OF EDUCATION, 1937. *Education of Backward Children*. H.M.S.O.

BOARD OF EDUCATION and BOARD OF CONTROL, 1929. *Report of the Mental Deficiency Committee*. H.M.S.O.

BROWN, J. E., 1958. "Junior school streaming: a survey." *Forum*, Vol. I, 19-21.

BURT, C., 1937. *The Backward Child*. U.L.P.

BURTON, H., 1948. "An E.S.N. class in a normal school." *Sp. Sch. J.*, Vol. 47.

CATTELL, R. B., 1950. "The fate of the national intelligence." *Eug. Rev.*, Vol. 42.

CHILD, H. A. T., 1955. *Studies in Education*. No. 7. Evans.

CLARKE, A. D. B. and CLARKE, A. M., 1954. "Cognitive changes in the feeble-minded." *Brit. J. Gen. Psych.*, Vol. 45.

CLARKE, A. D. B. and CLARKE, A. M., 1958. *Mental Deficiency—The Changing Outlook*. Methuen.

CLEUGH, M. F., 1957. *The Slow Learner*. Harrap.

EXETER EDUCATION COMMITTEE, 1956. *Adjustment Teaching for Educationally Subnormal Children in Exeter*.

FRYD, J., 1951. "The place of the mentally handicapped child in society." *Mental Health*, Vol. 10.

GELLNER, L., 1959. *A Neurophysiological Concept of Mental Retardation and its Educational Implications*. Julian Levinson Research Foundation.

GUNZBURG, H. C., 1950. "Social inefficiency and mental defect." *New Era*, Vol. 31.

HAY, A., 1958. "Provision in London for backward children." *Forward Trends*, Vol. 2, 67-70.

HEBER, R., 1960. "The concept of mental retardation: definition and classification." *London Conference on the Scientific Study of Mental Deficiency*.

HIGHFIELD, M. E., 1951. *The Education of Backward Children*. Revised ed., Methuen.

HILL, M. E., 1939. *The Education of Backward Children*. Methuen.

HILLIARD, L. T. and KIRMAN, B., 1959. *Mental Deficiency*. Churchill.

HILLIARD, L. T., 1958. "Common frontiers." *Forward Trends*, Vol. 2, 78.

HOWLETT, R., 1961. "Opening address to National Conference on the Backward Child." Bangor Normal College. *Forward Trends*, (Oct. 1961).

HURTIG, M., 1960. "Intellectual performances of 'real' and 'pseudo' mentally deficient children as related to former learning." *London Conference on the Scientific Study of Mental Deficiency*.

INTERNATIONAL BUREAU OF EDUCATION, 1960. *Organisation of Special Education for Mentally Deficient Children*. UNESCO.

JENSEN, R. A., 1960. "The importance of differential diagnosis in mental deficiency." *London Conference on the Scientific Study of Mental Deficiency*.

KIRK, S. A., 1960. "The effects of educational procedures on the development of retarded children." *London Conference on the Scientific Study of Mental Deficiency*.

KIRK, S. A. and JOHNSON, G. O., 1951. *Educating the Retarded Child*. Harrap.

LEICESTER EDUCATION COMMITTEE, 1953. *The Education of Retarded and Difficult Children in Leicester Schools*.

LEWIS, M. M. *The Importance of Illiteracy*. Harrap.

LLOYD, F., 1953. *Educating the Subnormal Child*. Methuen.

LONDON COUNTY COUNCIL, 1937. *Report of a Committee of Inspectors on Backwardness in Elementary Schools*.

LOWENFIELD, V., 1957. *Creative and Mental Growth*. New York: Macmillan.

MICHEL, R., 1955. "The adjustment of handicapped children to normal life." *International Federation of Teachers Associations*.

MINISTRY OF EDUCATION, 1946. *Special Educational Treatment*. Pamphlet 5. H.M.S.O.

MINISTRY OF EDUCATION, 1954. *Report of the Advisory Committee on the Supply and Training of Teachers of Handicapped Pupils*. H.M.S.O.

MINISTRY OF EDUCATION. *Education of Handicapped Pupils*, 1945-55. Pamphlet 30. H.M.S.O.

NATIONAL SOCIETY FOR MENTALLY HANDICAPPED CHILDREN, 1959. *Statistical Survey: The Education and Training of Mentally Handicapped Children*.

O'CONNOR, N. and TIZARD, J., 1956. *The Social Problem of Mental Deficiency*. Pergamon Press.

OLIVER, J. N., 1957. "The effect of physical conditioning exercises on the mental characteristics of E.S.N. boys." *J. Educ. Psych.*, Vol. 28.

PHILLIPS, G. E., 1940. *The Constancy of the I.Q. in Subnormal Children*. Melbourne University Press.

PRINGLE, M. L. K., 1960. "The Backward Child." Correspondence in *Times Educational Supplement*, Oct. 26, Nov. 9, 1960.
SADLER, G. T., 1959. "The Educationally Subnormal Boy of Secondary School Age." Unpublished Thesis for F.C.P., College of Perceptors.
SEGAL, S. S., 1961. *Eleven Plus 'Rejects'?* Schoolmaster Pub. Co.
SEGAL, S. S., 1961. "Ascertainment of educationally subnormal children." *Forward Trends*, Vol. 5, 45-48.
SEGAL, S. S. (editor), 1960. *Report of International Conference on the Backward Child.* Guild of Teachers of Backward Children.
STEIN, Z., 1960. "Diagnosis and prognosis by family type in the educationally subnormal." *London Conference on the Scientific Study of Mental Deficiency.*
STOTT, D. H., 1960. *The James Wykham Experiment.* Inst. of Educ., Bristol.
STOTT, D. H., 1956. *Unsettled Children and their Families.* U.L.P.
STOTT, D. H., 1957. *An Aetiological Study of 64 Educationally Subnormal Children.* Inst. of Educ., Bristol.
SUSSER, M. W., 1960. "Social selection of educationally subnormal populations." *London Conference on the Scientific Study of Mental Deficiency.*
TANSLEY, A. E. and GULLIFORD, R., 1960. *The Education of Slow-Learning Children.* Routledge.
TERMAN, L. M., 1919. *The Measurement of Intelligence.* Harrap.
TIZARD, J., 1960. "The residential care of mentally handicapped children." *Times Educational Supplement*, July 8 1960.
VERNON, P. E., 1960. *Intelligence and Attainment Tests.* U.L.P.
WALL, W. D., 1955. *Education and Mental Health.* UNESCO. Harrap.
WALL, W. D., 1958. "The wish to learn—research into motivation." *Educational Research*, Vol. I, 24-38.
WOODWARD, M., 1960. "The application of Piaget's concepts to mental deficiency." *London Conference on the Scientific Study of Mental Deficiency.*

TEACHING ARITHMETIC BY CONCRETE ANALOGY—I. MIMING DEVICES (Continued)

by J. D. WILLIAMS

Note: This is the second part of an article that appeared in the February, 1961, issue (Vol. III, No. 2) of this journal

Accessories for Containing and Measuring Number Lengths (Continued)

3. *Number-Tracks*

These are used to measure blocks that are joined end-to-end.

The Stern number-track consists of 10 sections, each of which is 10 units in length. The sections are numbered so that when they are joined together, the number scale from 1-100 is represented. A central groove holds the blocks to be measured, and a jumper, which bridges the track, helps to mark on the scale the position to which the blocks extend. Part of the Stern track is shown in fig. 18.

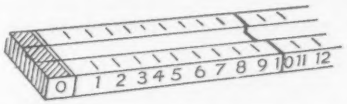


FIG. 18. THE STERN NUMBER TRACK

The Avon '100-channel' carries as many units as the Stern track but is graded only in 10s, and does not dismantle into sections of 10. There is also a '20-channel' for use with smaller numbers. In order to measure the value of the pieces in the Avon channels, the child reads off the value to the nearest 10, and can quickly see how many dots there are in excess of this.

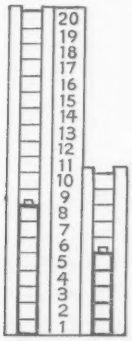


FIG. 19
UNIFIX 1—20
NOTATION AND COUNTING LADDER

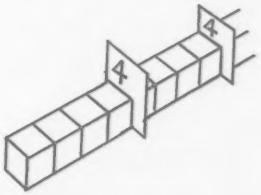


FIG. 20
UNIFIX MARKERS

There is a Unifix 1-20 Notation and Counting Ladder that serves a similar purpose. This consists of a 20-track with a 10-track by its side. Into this 10-track can be placed a block representing the number to be added, or that has been taken away. In addition to this counting ladder, there are Unifix Multiplication and Division Markers which fix between the blocks as shown in fig. 20 and can be used to indicate the number of units lying between them. These can be used with or without the Counting Ladder.

Apart from their obvious uses for adding and subtracting and as a simple measuring device, number tracks have the following special uses:

(i) Teaching counting and notation above 10. The relationship between the number facts in different decades can be very convincingly shown by placing the sections of the Stern track in parallel and bridging across two or more of them with a pencil. Thus, it can be shown that $18-16=38-36=8-6$, etc.

(ii) Multiplying and dividing. In multiplying, a certain number of equal pieces is placed on the track, and the product read off on the scale. In dividing, the dividend is registered on the scale, a number-piece is taken to represent the divisor, and the child ascertains how many of these pieces it will take to reach the level of the dividend. In the Avon number channel this is very convincingly done by inverting the divisor so that its number shows, and then covering up pieces representing the dividend within it. See fig. 21. The multiplication tables can be systematically taught using the number track.

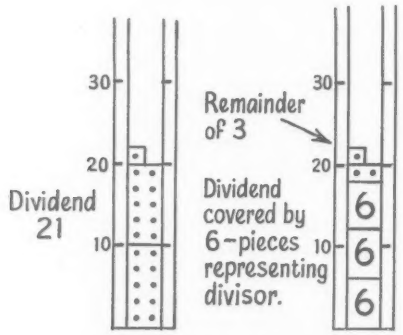
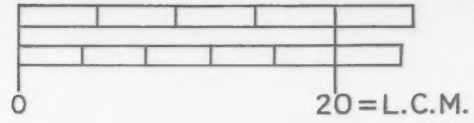


FIG. 21
DIVISION IN AVON NUMBER CHANNEL

(iii) Teaching directed numbers. For this purpose, it is desirable to have two scales progressing away from a common zero point. This can be devised either by re-numbering the track or by placing two tracks end-to-end at zero.

(iv) Using two parallel tracks, or in the case of the flat Avon number pieces, covering one set of lengths by another, L.C.M.s of two numbers can be demonstrated as in fig. 22.



5-PIECES IN FIRST TRACK
4-PIECES IN SECOND TRACK

FIG. 22

4. *Positional Notation Containers*

These are trays with a partition, on the right-hand side of which there is room for no more than 9 units, and on the left-hand side of which there is room for a number of 10-lengths—10 in the case of the Stern, shown in fig. 23, and 5 in the case of the Unifix; in order to demonstrate that ten 10-lengths would form a hundred, and therefore belong to a different position, the Avon container has room for only *nine* 10-lengths.

With the Shaw apparatus, shown in fig. 24, there is a Tens and Units Card to serve this function. This is placed in the slot on a 20-base, and allows 9 units and 9 tens to be structured. Hundreds are represented either by *bundles* of rods or by 10 ten-rods in separate bases; these 100-bases are placed at right-angles to the Tens and Units bases.

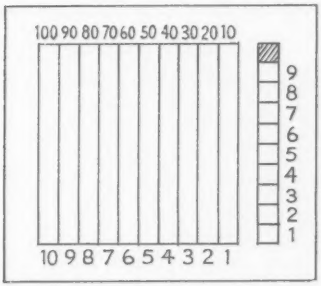


FIG. 23
THE STERN DUAL BOARD

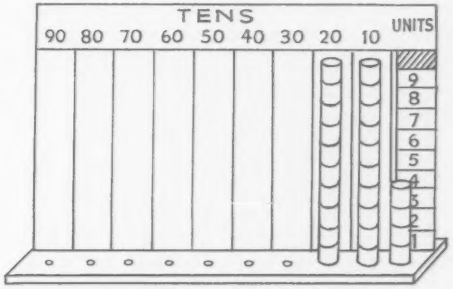


FIG. 24
TWENTY-FOUR STRUCTURED WITH THE SHAW TENS AND UNITS CARD

There is also a shillings and pence card with the Shaw apparatus. This allows 11 units in the pence column and several structures of 12 units in the shillings column.

With the Dienes apparatus no such positional notation containers are provided, but teachers are instructed to make their own. These are not meant to help the child to *measure* at what number to change from one position to another, but merely to indicate where to place the number-pieces.

The positional arrangement of numbers in addition and subtraction examples can

be depicted by using three of these containers arranged below one another as in fig. 25.

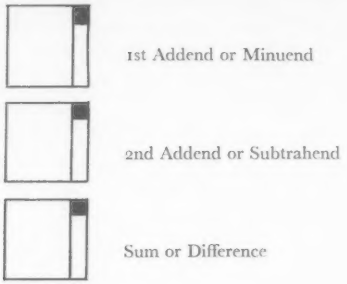


FIG. 25

Such an arrangement of the Avon, Stern and Unifix containers takes up a great deal of space, however, and on this account, the vertical structuring of the Shaw device gives it the advantage. In this case it is necessary merely to place another 20-base in front of that containing the notation card, and you have the three rows required for an addition or subtraction example.

5. *Multiplication Devices using the table of Pythagoras*

The table of Pythagoras is used with many different devices for consolidating and testing the multiplication and division facts.

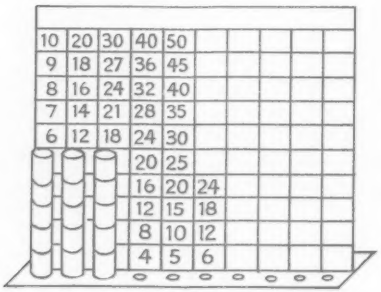


FIG. 26
THE SHAW MULTIPLICATION CHART
SHOWING 3×5

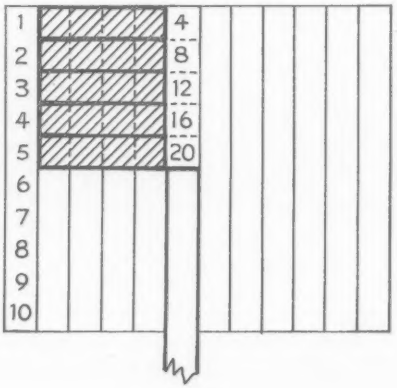


FIG 27
THE STERN MULTIPLICATION
MACHINE

In fig. 26 it is being used with a Shaw base. Three of the 5-rods are placed by the first three columns, and the number the last rod reaches is the product of 3×5. If

one wanted to divide 17 by 5, one would structure rods with 17 units so that as many as possible reached the row beginning with 5, and then one would read off on the bottom row how many complete 5-rods had been structured. Any left over would be the remainder, of course.

Stern's Multiplication Machine is another such device. This consists of a Table of Pythagoras in which numbers progress from top to bottom. The 10 columns are each covered with a movable strip of card, one unit wide. There is an extra column to the left of the table, also 1 unit wide, and a duplication of the first column of the table to the left of this. If 5×4 is required, five 4-blocks are arranged as shown in fig. 27, and the strip that they reach is moved, exposing the number on the table they reach down to. This is their product.

The Montessori version is a board with ten columns of ten perforations into which beads can be placed. A counter is placed by one of the numbers at the tops of the columns to represent multiplicand, and a number slip is placed at the side of the board to represent the multiplier. A number of rows equal to the multiplier are each filled with a number of beads equal to the multiplicand, and the product counted. See fig. 28.

Bass uses a " Convecta Board " on which children build up their own table of Pythagoras with a set of number cards. At the bottom of this board are the numbers of columns 1-10. Writing ' 1 ' in the margin to the left, the child fills in the first row, counting in ones. Then, writing ' 2 ' above the ' 1 ' he fills in the second row, counting in twos, and so on.

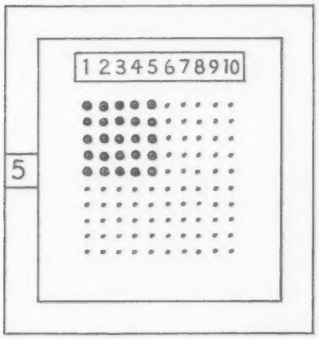


FIG. 28
THE MONTESSORI VERSION

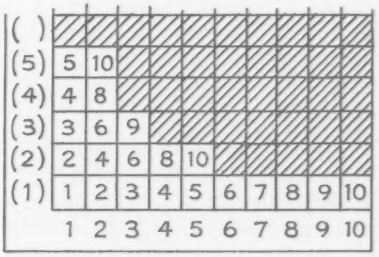


FIG. 29
THE CONVECTA BOARD

6. *Addition Chdrts, etc.*

The Shaw 100-chart consists of 10 columns, in each of which is numbered one of the decades from 1-100. The bridging of decades can be very clearly illustrated on this. To add a 7-rod to an 8-rod, it would be necessary to add enough units to the 8-rod to fill the first column, and structure the remainder (up to 15) in the second.

The Montessori Addition Strip Board illustrates number combinations up to 18. It consists of a board with columns ruled and numbered from 1-18. There are two

sets of rulers each from 1 to 8 units in length; one set is red, and one blue. The length of each ruler is marked on it. Different combinations of red and blue rulers are placed end-to-end across the columns, and the number they add up to is read off from the top of the last column they cover. Fig. 30 shows a demonstration of $2+4=6$.

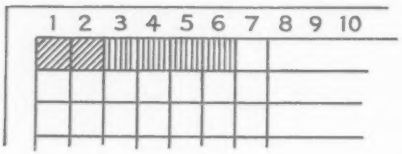


FIG. 30
A BLUE 2-RULE AND A RED 4-RULE, ADDING UP TO 6 ON THE MONTESSORI ADDITION STRIP BOARD

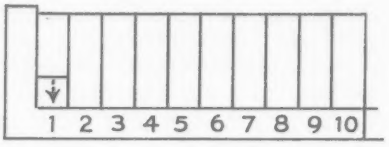


FIG. 31
THE BASS COUNTERPLAY BOARD

7. *The Bass Counterplay Board*

This has numbers 1-10 along the bottom, and ten columns of three spaces to correspond to these numbers. Square counters bearing a dot and an arrow are placed in these spaces with the arrow pointing *towards* the number for addition and multiplication, and *away* from it for subtraction and division. In addition and subtraction, only one row of counters is used; counters are matched with the numbers, and more added or some removed. In multiplication, a number of counters equal to the multiplicand is placed by each number up to that of the multiplier, and then the counters are spread out, one per number, to give the product. In division the counters are gathered up into groups equal in size to the divisor. In fig. 31 there is one counter on the board.

Number Patterns

One way of teaching children how many things a number-symbol stands for, is to get them to associate the symbol with a particular number-pattern. These patterns can be chosen either for the uniqueness of the *gestalt* they present to the child (so that they do not become confused with one another) or for the number-relationships they make clear.

Dominoes bear very distinct patterns, and are therefore not likely to be confused with one another. However, these patterns do not give much indication of the sorts of relationship that can obtain between the numbers they represent. Take the numbers 4 and 8. In the domino patterns often used in schools, an addition 4 + 4 to give 8 would be depicted as shown in fig. 32.

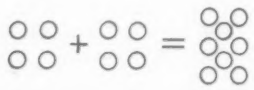


FIG. 32

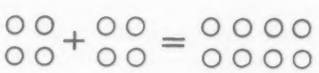


FIG. 33

Two devices, the Stern pattern boards and the Avon number-pieces (see section on number-lengths for description of the latter) sacrifice some uniqueness of pattern for clarity of number-relationships. Thus, in these, 4+4 can be *seen* to equal 8. See fig. 33. In the case of the Avon, these patterns are constantly in front of the child in all of his dealings with the number-pieces. In the Stern, the child can learn the significance of these patterns by trying to fit various numbers of units into them.

An important feature of this sort of number-pattern is that it distinguishes clearly

FIG. 34
PATTERNS ON THE AVON NUMBER-PIECES

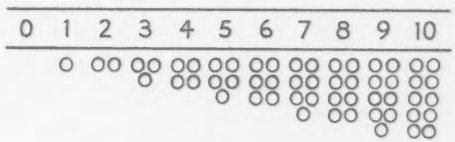


FIG. 35

between even (divided into two equal columns) and odd (divided into two different columns) numbers. In the Montessori system this distinction is made in a different way. A strip bearing numbers 0-10 is placed in front of the child, who is encouraged to set out counters in front of each number in the arrangements shown in fig. 35. The child is shown that he can move his finger between the two columns formed by even numbers, but that its progress is impeded by the extra counter in the case of odd numbers.

Although at an earlier stage the patterning of the units in a number will provide the child with a visual aid to remembering what the cardinal significance of the number is, he will later on need to recognise the number of units arranged in all sorts of patterns. To this end, the pegboard can be used effectively.

The Pegboard

Of the sets of devices that we are considering, this item figures in the Shaw, the Dienes and the Montessori; the ways in which it is used can be related to three characteristics of the peg:

1. differences in colour (with all the pegboards we shall consider, variously-coloured pegs are provided);
2. differences in colour with a numerical significance (in the Montessori system, green stands for units, blue for tens and red for 100s);
3. structurability (the Shaw pegs have this advantage).

There follow some of the uses that can be made of the pegboard.

By grouping a number of pegs into numbers of equal rows it is possible to demonstrate the factors of this number. 12 for example, makes 2 rows of 6 pegs, (or 6 of 2) and 3 rows of 4 pegs (or 4 of 3). The highest *common* factor of two numbers can be found. Thus, of 12 and 8, this would be 4.

Prime numbers can be shown to form only *un*equal rows.

Square numbers form as many rows as the pegs contained in each row.

Important relationships like A × B = B × A can be demonstrated by letting the

first letter on each side of the equation represent the number of rows of pegs and the second letter, the number of pegs per row. Taking the pegs in fig. 36 horizontally, it can be seen that A rows contain B pegs each, but, taking them vertically, B rows contain A pegs each. Thus it can be demonstrated that although the number of pegs is constant, this number can be described in two different ways.

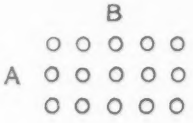


Fig. 36

Again, let short rows of red pegs equal X, and long rows of green pegs equal Y. The arrangement on the pegboard demonstrates that Z (X + Y) = ZX + ZY; in the particular example shown below, Z = 3.

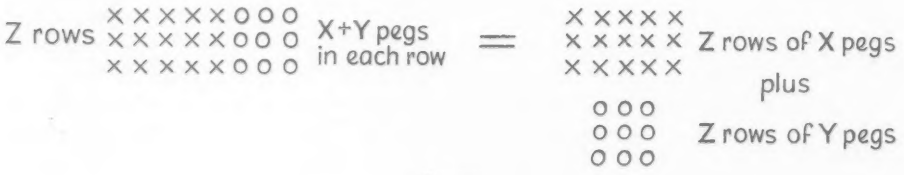
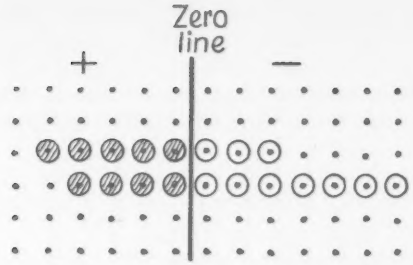


Fig. 37

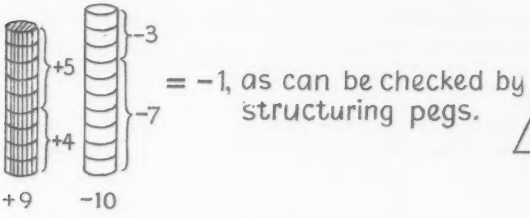
With pegs of two different colours, a scale for demonstrating negative numbers can be devised—using, say, a line of red pegs for the positive numbers, and a line of green pegs for the negative numbers. With pegs that can be structured upwards like those of the Shaw apparatus, positions on this scale could be filled up to the number in question, and then this number could be checked by structuring separately all the negative and all the positive pegs and comparing the resultant structures. See fig. 38.

Thus, one advantage of structurable pegs is that representations by them can be checked either by counting in a horizontal plane or by measuring in a vertical plane; another advantage is that they can be used to depict cubed numbers much more compactly and convincingly than can unstructurable pegs. Compare 3^3 in fig. 39b with the two dimensional representation of it in fig. 39a.

Finally, such expressions as $(a+b)^2 = a^2 + 2ab + b^2$ can be depicted as shown in fig. 40. Where, as in the Montessori system, pegs are given values in units, tens or hundreds, depending on their colour, squares of such two-figure numbers as 25 can be depicted similarly; for $25^2 = (20+5)^2$. Here, the four pegs in the top left-hand corner will each be hundreds, for these represent two *tens* times two *tens*. The twenty five pegs in the



5+4−3−7 shown on the peg board.



= −1, as can be checked by structuring pegs.

FIG. 38

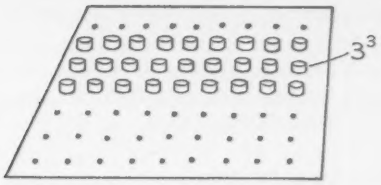


FIG. 39a

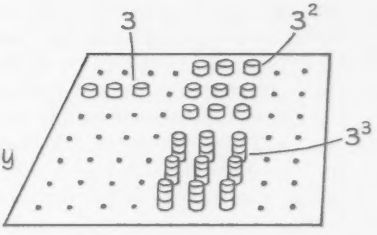


FIG. 39b

bottom right-hand corner will each be units, for these represent five *ones* times five *ones*. The other two pairs of rows will be of 10-pegs, because each pair of these represents five *ones* times two *tens*.

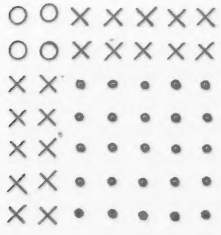


FIG. 40

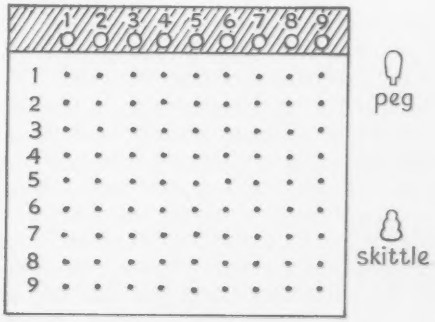


FIG. 41
THE MONTESSORI DIVISION BOARD

The Montessori Division Board is a species of the pegboard. For each column of pegs there is a numbered socket into which a skittle can fit to represent a divisor. A number of pegs equal to the dividend is arranged so that there is a column of the same length under each unit of the divisor, and the quotient (the number of pegs per column) is then read from a vertical scale numbering each of the rows. The board, together with a peg and a skittle, is shown in fig. 41.

Fraction Devices

The use of Number-Lengths

Obviously, the number-lengths can be used for teaching fractions. If $\frac{1}{10}$ needs to be depicted, a 10-length is thought of as the whole, and the unit-length becomes $\frac{1}{10}$. If an illustration of $\frac{1}{6}$ is needed, the 6-length becomes the whole, and accordingly the unit-length becomes $\frac{1}{6}$. But this use of the rods has two disadvantages:

1. The representation of a whole varies with the fraction under consideration; this is not an essential feature of fractions, but inherent in the nature of the device.
2. As a consequence, the fractions formed are not comparable, for $\frac{1}{10}$ is represented by the same unit-length as $\frac{1}{6}$.

Of course these disadvantages *could* be overcome by structuring a ' whole ' number length that was equal to the common denominator of the fractions being considered, but such a whole would often be unwieldy.

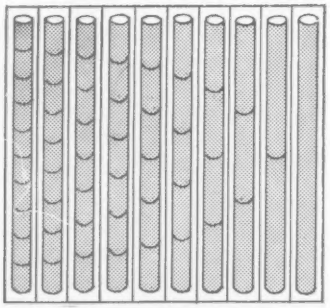


FIG. 42
THE KEIGHLEY FRACTION BOARD

The Keighley fraction board contains a representation of one whole, and the fractions from $\frac{1}{2}$ to $\frac{1}{10}$, in thick, wooden, variously-coloured rods. When other clues are not available, the colour of a part serves to indicate which fraction it represents. These fractional parts can either be compared in the channels in their container, or be stood vertically for comparison. Although this has the advantage over the number-lengths that the fractions are comparable with one another, it is less flexible than the lengths in some ways. Fractions smaller than $\frac{1}{10}$ cannot be represented, so it is not possible to represent some processes involving say both $\frac{1}{2}$ and $\frac{1}{7}$, for these would require a common denominator of 14. By changing the size of the whole, any denominator can be depicted with the number-lengths. The board is illustrated in fig. 42.

Fraction-Measuring Devices

The " Convecta Fraction Board " described in Bass and Dowty's book illustrates very neatly many of the relationships between fractions. It bears 10 equal vertical lines: one undivided line, and others that are divided into fractions from $\frac{1}{2}$ to $\frac{1}{10}$. All the fractions depicted are marked off on a line to the left of the board, and the number of parts (1 to 10) in each fraction-line is marked below it. The fraction lines can be joined horizontally, thus indicating equivalences among the fractions. One can be seen to equal $\frac{2}{2}$, $\frac{3}{3}$, $\frac{4}{4}$, etc. The decimal equivalents of tenths can be seen.

Such a fraction board, though, does not encourage children to find out about fractions by manipulation of objects as does the Stern apparatus. This consists of a set of 10 rectangular frames with transparent fronts, all of the same size. Lines are marked down the fronts, dividing the frames into different fractions. The fraction of the frame up to each line is indicated as shown in the diagram. To each frame there is a set of plates, each the appropriate fraction of the length of the frame. $\frac{1}{2}$ is written on both of

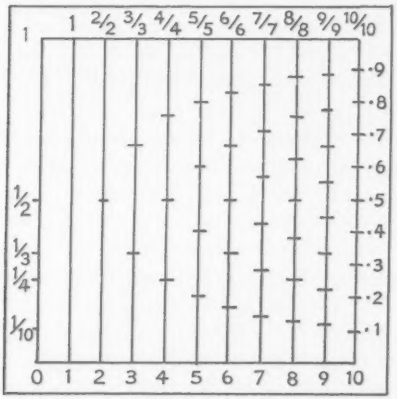


FIG. 43
THE CONVECTA FRACTION BOARD

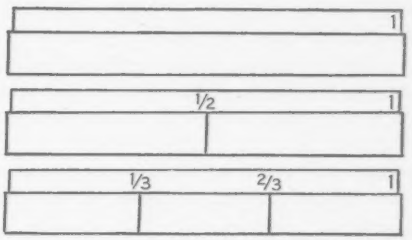


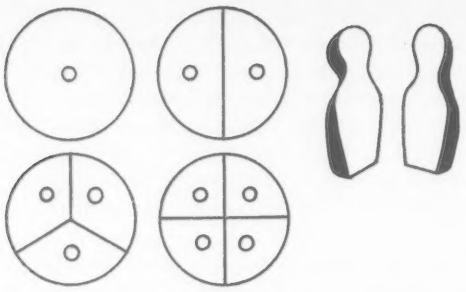
FIG. 44
THREE OF THE STERN FRACTION FRAMES

the $\frac{1}{2}$ plates, $\frac{1}{3}$ on each of the three $\frac{1}{3}$ plates, and so on. Using the frames to measure the plates the child can find out equivalences between the part-plates and the whole-plate and between different part-plates. Children can make their own plates out of cardboard, and, when a common denominator between fractions in two of the frames is not already represented by plates, they can construct out of cardboard fraction-parts to represent it. Three of the ten frames are shown in fig. 44.

Montessori Insets and Skittles

The insets consist of ten metal discs that fit into frames. Each of these is divided into a number of sectors to represent a different fraction. Children can remove sectors from the frames and replace them, or compare sectors by placing some into the gaps left by others.

Large skittles, divided into $\frac{1}{4}$s, $\frac{1}{3}$s and $\frac{1}{2}$s, can be used with these insets to demonstrate



Insets

Divided Skittle

FIG. 45
SOME MONTESORRI FRACTION DEVICES

division of fractions. Thus, to demonstrate $\frac{1}{2} \div \frac{1}{2}$, a sector equivalent to $\frac{1}{2}$ is placed by the skittle. The skittle is then separated into two halves, and the child is asked how much of the sector each half will get. He replaces the half by two quarters and gives a quarter to each of the half-skittles.

Decimals are equated with vulgar fractions with the help of a circular frame divided into hundredths. The sectors are placed in this, and then the number of hundredths each sector equals can be read off.

Shapes of Fractions and Fractions of Shapes

Taught with one or other of these devices alone, children might well fail to realise the diversity of physical embodiments of fractions. Lowenfeld's Poleidoblocs G and A will help them with this realisation. These consist of pieces of wood which bear a simple mathematical relationship to one another, although they are of many different shapes and sizes. For example, the Poleidoblocs G are large coloured blocks, some of which are sections of larger cubes cut diagonally to form prisms, transversely to form slabs, and horizontally/vertically to form pillars. Poleidoblocs A are pieces of plain wood based on a unit $1'' \times 1'' \times \frac{1}{2}''$. This unit is divided into halves (rectangular *and* triangular) and quarters, and also multiplied to form larger blocks, that are $1'' \times 1''$ or $2\frac{1}{2}''$ in cross section, or $2''$, $1''$ or $\frac{1}{2}'' \times \frac{1}{2}''$; some of these are also halved diagonally. Depending on which larger pieces or combination of pieces are taken to stand for the whole, various fractional relationships can be demonstrated between a variety of shapes of wood.

The Montessori apparatus also includes various shapes that can be broken down into fractional parts.

Decimal Fractions

In most of the devices we have considered, tenths are depicted—thus an introduction to decimal fractions is afforded. However, we shall examine the teaching of decimals more fully in a later section, when devices demonstrating the powers of ten will be described.

The Balance

The Dienes Algebraical Experience Materials include a simple wooden balance, on both arms of which are hooks, spaced equally and numbered 1-6 away from the fulcrum. For weights, heavy metal rings are used. The spacing of the hooks is such that X rings on hook Y will balance Y rings on hook X. See fig. 46.

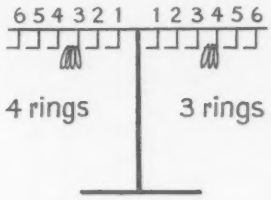


FIG. 46
THE DIENES BALANCE, SHOWING $4 \times 3 = 3 \times 4$

This instrument is good for demonstrating equations, but is at a disadvantage when these involve large numbers, for there is a limited number of hooks and each hook holds only a few rings. Because of this, it is often necessary to represent a number in terms of its components or factors. Thus, 15 might be represented as 5 rings on the 3-hook, or 5 on the 1-hook and 5 on the 2-hook. In this case it would not be very evident that there was *one* term of value 15. Again, three-termed (or more) multiplicative relationships cannot be expressed very clearly. X × Y can be demonstrated by placing X rings on hook Y, but since there is not room to group rings on the hook, it cannot be shown that X rings have been placed on the Y-hook Z times. Thus, with the balance, it is not always possible to depict clearly the component terms in an expression. For this reason, perhaps this device should be used primarily for *checking* rather than for illustrating calculations.

Further, although balancing is a very convincing demonstration of equality, the rules according to which the arms of the balance are weighted will not be immediately convincing to the child. He will have to *learn* that the value represented by each hook is greater the further its position from the fulcrum. However, once he has learnt to assume this, the device will parallel numerical operations for him quite consistently.

Thus, although this device does involve making some assumptions about the environment that the child would not normally have made before, it parallels number operations much more closely than could the use of colours, for, by virtue of the law of moments, the values of the hooks must be in serial order and be in proportion to their position on the arm; there is nothing intrinsic to *colours* that makes them consistently behave as if they had the cardinal and ordinal properties they must be assumed to have in Cuisenaire's system.

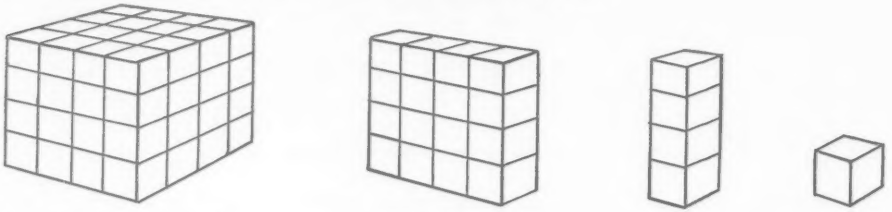
Devices for Illustrating Powers

As pointed out in a previous section, cubes and higher powers *can* be illustrated

in two dimensions (or one, come to that) but the result is visually less easy to appreciate, and, especially in the case of powers of large numbers like 10, much more unwieldy to manipulate than when illustrated in three dimensions. In the devices described below, all three dimensions are used.

Powers of Ten

The Montessori, Stern and Dienes apparatus for depicting these is approximately the same, and the essential components are shown in fig. 47.



Stern	1,000-cube	100-square	10-row	Unit
Dienes	Block (base 10)	Flat (base 10)	Long (base 10)	Unit
Montessori	1,000-bead cube	100-bead square	10-bead bar	Bead

FIG. 47
TERMINOLOGY FOR POWERS OF TEN IN DIFFERENT SYSTEMS

In the case of Stern and Dienes, the unit is a small wooden cube,

the 10-piece = 10 unit cubes in size,
the 10^2 = 100 unit cubes in size,
the 10^3 = 1000 unit cubes in size.

The larger pieces have grooved surfaces so as to give the appearance of being composed of unit cubes.

The Montessori apparatus has a spherical bead for its unit, and the other pieces are actually composed of spherical beads. In the case of the Montessori it is much easier to see that the larger pieces are made of the unit beads, because there are gaps between the beads emphasising the fact that they are discrete, and, in the case of the 1,000 bead cube, exposing the beads in the body of the cube. However, the Stern and Dienes pieces have the advantage that they can be much more stably structured into larger pieces.

The composition of the Montessori 10^2 and 10^3 pieces can be demonstrated by single long bars, made, respectively, of ten 10-bead bars and a hundred 10-bead bars.

With the aid of this apparatus, the structure of the decimal number system can be taught. These pieces can be arranged in the same way as our numbers are arranged —in columns of 10^3s, 10^2s, 10s and units. The reason for carrying and borrowing can be made quite evident, for when there are ten or more pieces in one column it will be *seen* that a piece can be constructed that belongs to the next column up, and when it is necessary to borrow a piece from a higher column, it will be *seen* that this is equivalent to 10 pieces of the lower column.

The special consequences of multiplying or dividing by the base-number, 10, can be demonstrated.

When higher orders, like 10,000, 100,000 and 1,000,000 are needed, composite pieces can be made.

It should be noted that since there are only three dimensions in which to construct these pieces, there will be a recurrence of shapes at every third order of 10. Thus,

1, 10^3, 10^6, etc. are all cubes,

10, 10^4, 10^7 etc. are all *rows* of cubes,

10^2, 10^5, 10^8 etc. are all *slabs* of cubes.

This fact enhances the usefulness of these pieces in illustrating decimal fractions, for, instead of the unit-cube, the thousand-cube can be taken to represent one, so that the hundred-piece will then be in the ·1 position, the ten-piece in the ·01 position, and the unit-cube in the ·001 position.

Powers of Numbers Below Ten

The Montessori and Dienes apparatus includes illustrations of powers for numbers below ten. Thus, for many numbers such operations as multiplying by adding indices and dividing by subtracting indices can be demonstrated.

Dienes illustrates the four rules in number systems to lower bases than ten. He uses the bases 3, 4, 5 and 6, in each of which he has pieces analogous to those in his base-10 set. Thus in his base-3 set a ' long ' is made up of 3 unit-cubes, a ' flat ' of 9 unit-cubes (3^2), a ' block ' of 27 unit-cubes (3^3). An addition in this set would look like this:

	Blocks	Flats	Longs	Units
	1	2	2	1
+		1	2	2
	2	1	2	0

for, in a number system to this base, units would be converted to ' longs ' as soon as there were three of them.

Dienes holds that working in a variety of number systems, like this, children will be able to abstract the *essence* of such concepts as positional value, and disengage these concepts from special features of the particular system in which these are usually practised. However, there is another advantage:

Using number systems to lower bases, the various processes can be illustrated with much smaller numbers. Thus, in the addition sum shown above, no number above 2 was written down, and no number above 3 was thought of. Working with such small numbers, children can actually *see at one glance* when they have enough units to make a ' long,' how many ' longs ' a ' flat ' will make, and so on. This makes the process much more intelligible.

The use of logarithms can be better demonstrated with blocks in a number system to a base less than 10, for roots of 10 (e.g. 10^{-3}) do not lend themselves to simple illustration, and all the whole-integer powers of 10 are (*a*) such large numbers and (*b*) so easy to

multiply together or divide one into the other by the process of re-positioning, that the need for the use of logarithms is not very evident.

The nature of logarithms can be very profitably demonstrated working to the base 3.

These materials have obvious applications to the teaching of measurement of volume.

Some Devices for Teaching Elementary Algebra and Geometry

We have already described the pegboard and the balance. These constitute two of the five different sorts of Algebraical Experience Materials used by Dienes to demonstrate algebraical relationships. Dienes holds that by seeing these relationships in a variety of different embodiments, the child has more opportunity to abstract the underlying concepts. The three remaining devices are:

1. Flat pieces of wood forming: small unit squares $1'' \times 1''$; strips one unit wide but of two different lengths, neither of which is an exact multiple of a unit; squares of side equal to the length of one or other of the strips; non-square rectangles that are multiples of the units.
2. Flat pieces of wood forming equilateral triangles of side 1-6 inches.
3. Containers of objects. These are not provided, but the teacher is recommended to improvise them (e.g. boxes of matches).

The rectangular pieces of wood can be used to depict many algebraical relationships, in which the small squares represent units, the strips, X, the non-square rectangles, XY, and the large squares, X^2. Since X is no exact multiple of the unit, pupils are not so tempted to think of it as having some particular value, and, because of this, it can be used more convincingly (*a*) as an unknown quantity whose value is to be found, (*b*) as a term whose value is irrelevant to the algebraical relationship being depicted; although the pegboard and balance can be used to parallel these pieces of wood in depicting *many* relationships, they are without *these* two advantages, for on both of these devices all terms must be represented by a number of units.

The triangles afford a spatial illustration of a mathematical square that is not a geometrical square, for 3 one-inch triangles times 3 = one three-inch triangle. They can be used in many other ways to parallel the rectangular depiction of relationships.

Placing things into boxes is a natural way of grouping them into different numbers. An empty box can be used to stand for zero, for an unknown, or for a term whose value is irrelevant.

One would expect that geometrical relationships would be particularly suitable for spatial depiction. Since they are devoted to the description of shapes and sizes, this is so. But it should be noticed that here, the structural device is likely to be exemplifying a particular mathematical description rather than miming a fundamental mathematical operation. The device is often merely a concrete actualisation of the particular shape that the mathematical expression has been invented to describe.

Nearly all of the devices considered so far are admirably suited to deriving the area of a rectangle, particularly devices like the Dienes A.E.M. and the Lowenfeld, in which flat unit squares are provided. These unit squares can be placed over a surface to show

how many square units it will hold.

In his book *From Actions to Operations*, Gattegno describes some uses of the ' Geoboard.' This is a board bearing regularly-arranged nails, over which elastic bands can be stretched to depict a variety of figures.

The Montessori apparatus includes devices for demonstrating how to derive the area of simple figures like the triangle and trapezium. In both cases, components of these shapes are rearranged to form rectangles, as is shown in fig. 48.

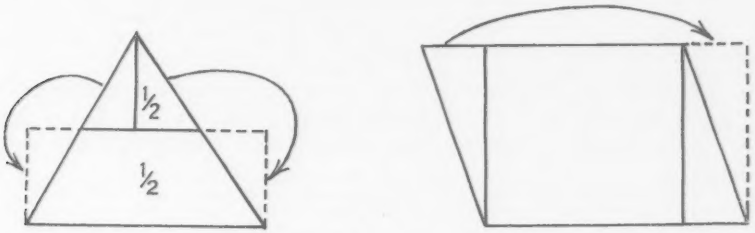


FIG. 48
TWO MONTESSORI DEVICES FOR TEACHING GEOMETRY

As indicated earlier, those devices constructed out of unit cubes, like the Stern, Cuisenaire, Dienes M.A.B., and Lowenfeld, are very suitable for introducing the measurement of volume. Of these, the Dienes and Stern have the advantage that the surfaces of the larger pieces are grooved, so as to indicate composition out of unit cubes.

Conclusion

It has been shown in this article that many of the devices used in teaching primary school arithmetic can be grouped into a few general categories. In a later article it will be seen that there are likewise general procedures common to many of those systems of teaching which make use of these devices.

Some Additional Materials

Since the above was written, information has been received about the following:

The Arithmetic Abacus—L. G. W. SEALEY

This consists of three rows of four vertical shafts mounted on a flat base. Numbers are represented by flat, inch-square counters. These are in four different colours, and have a hole in the centre, to enable them to be structured on the shafts. The three rows can be used to depict the three lines in a conventionally set-out addition, subtraction, or multiplication example—the four columns representing different orders of ten. A different colour of counter is used for each of the different orders of ten.

If, as is usually the case, operations in the *decimal* number-system are to be depicted, the shafts used should be of such a length that only nine counters can be structured on each before it is necessary to exchange these for one counter in the next order of ten. However, by altering the length of the shafts, operations in other number-systems can be performed.

Thus, this device enables the child to parallel in concrete form the written lay-out of many arithmetical operations in a variety of number-systems.

Mathematics Discovery Material—L. G. W. Sealey

This consists of flat red number lengths, 1-10, marked off into units of one inch square. The unit pieces are in two different colours. These can be used in much the same way as was described in the first part of this article. Being flat, they can easily be superimposed.

The Venture Number Apparatus—G. Griffiths

The complete set consists of the following:

1. Number rods from 1-10, marked off on one side into units of a half inch cube. These are made of wood, and, unlike the Stern and Cuisenaire rods, are not differentially coloured.

2. Four number tracks, numbered up to 10, 12, 20 and 36, respectively.

3. Coloured fraction rods to represent eighths, quarters and halves.

4. Two flat ' covering rods,' one to conceal the number-symbols on the 36 track, and the other to measure the fraction rods.

5. Two square trays, on both of which are marked unit squares. One tray holds 100 units and the other holds 144 units. ' Tray cards ' can be fitted into the latter, bearing number-symbols from 1-144.

It will be seen that this set of apparatus includes representatives from many of the categories considered above.

Sources

ARNOLD & SON, LTD., 4 Chenies Street, London, W.C.1, supply the Keighley Fraction Board, the Measurement Stair and the Leighbridge abacus.

" AVON " NUMBER APPARATUS—devised by B. R. Jones, Newton Park College, Bath. Obtainable from James Galt & Co., Ltd., Brookfield Road, Cheshire.

BASS, W. G. and DOWTY, O.S., *Counting and Arithmetic in the Infants School*. George Harrap & Co., Ltd.

CUISENAIRE, G. and GATTEGNO, C., *Numbers in Colour*. Heineman, 1954. Materials are obtainable from the Cuisenaire Co., Ltd., 11 Crown Street, Reading.

DIENES, Z. P., *Building Up Mathematics*. Hutchinsons, London, 1960.

DIENES, Z. P., " The Growth of Mathematical Concepts in Children through Experience." *Educational Research*, Vol. II, No. 1, 1959. The materials are supplied by the National Foundation for Educational Research in England and Wales, 79 Wimpole Street, London, W.C.1.

FISHER, D. C., *The Montessori Manual*. Kegan Paul & Co., Ltd., 1914.

GATTEGNO, C., *From Actions to Operations*. The Cuisenaire Co., Ltd., 1958.

LOWENFELD, M., a manual for use with the Poleidoblocs G and A is being prepared and should be ready shortly. These materials, together with an introduction and suggestions for their use, are obtainable from Dr. M. Lowenfeld, 92 Harley Street, W.1.

MONTESSORI APPARATUS. Information on this was generously offered by the St. Nicholas Training Centre, 15 Dawson Place, W.2, and the Montessori Association, 1 Park Crescent, W.1. Materials can be obtained from both of these places.

MONTESSORI, M., *The Advanced Montessori Method. II: The Montessori Elementary Material*. Heinemann, 1918.

SEALEY, L. G. W., *The Creative Use of Mathematics in the Junior School*. Basil Blackwell, Oxford, 1961. Materials are obtainable from H.C.P. (Products) Ltd., 32, Churchgate, Leicester. This firm also produces the Venture Number Apparatus, and a balance similar to that used by Dienes, but with 9 hooks on each arm instead of 6.

SHAW, H., a manual for use with these materials has been prepared and is awaiting publication. The materials (" Structa " apparatus) are obtainable from James Galt & Co., Ltd., Brookfield Road, Cheadle, Cheshire.

STERN, C., *Children Discover Arithmetic*. Harper & Bros., New York, 1949. Materials are obtainable from The Educational Supply Association, 181 High Holborn, W.C.1.

UNIFIX MATERIALS are supplied by Philip & Tacey, Ltd., 69-79 Fulham High Street, London, S.W.6.

Note: The author would be grateful for any information about variants of the materials described, or other kinds of material. Please address communications to J. D. Williams, N.F.E.R., 79 Wimpole Street, London, W.1.

Research Note:

LENGTH OF SCHOOLING AND ITS EFFECT ON PERFORMANCE IN THE JUNIOR SCHOOL

by D. A. Pidgeon and Evelyn M. Dodds

Introduction

THERE is a general, but not universal, rule in this country that children start formal schooling at the beginning of the term in which they will become five years old. This means that, according to their birth date, children will commence their Infant schooling on one of three dates in the year. Subsequently, however, transfer to a Junior school where it occurs, and the later transfer to a Secondary school, takes place only at the beginning of the school year, and again the general rule is for those children to be transferred who will have reached the promotion age by September 1st or some date near this. It follows, therefore, that all children do not spend the same time in Infant or Junior schools and the difference can in fact amount to one whole year.

For example, a child who was born in July 1952 may start school in the Summer Term 1957 and will be due for transfer to a Junior department in September 1959, having completed 7 terms of Infant schooling only. Another child, however, born in September 1952 and starting school in the Autumn Term 1957 will only be 6 years 11 months old on September 1st 1959 and will therefore stay one further year in the Infant department. This child will not be due for transfer to the Junior department until September 1960, having completed 9 terms of Infant schooling. The extreme case can occur for two children born each side of September 1st—perhaps only a few days apart in age. Both children may start school together in the Autumn Term, but the one born before September 1st will complete only 6 terms of Infant schooling before being transferred to the Junior school, whilst the other will complete 9 terms. This difference in length of schooling persists, of course, so that in the extreme case just quoted one child may receive 6 years of schooling (2 Infant and 4 Junior) before being transferred to a Secondary school, whereas the other may receive 7 years of schooling (3 Infant and 4 Junior).

Teachers have been aware of this difference, yet little work appears to have been carried out to discover what effect, if any, it has on later performance. Many have suggested, not unreasonably, that within any given year group, the children who have received more schooling will have learned more and hence when examined will produce better performances. However, it must also be realised that, again within any one year group, children differ in age by as much as 12 months, and when examined at any time during a year it is the older children who have also received longer schooling. Hence, if differences in performance are found amongst children with different lengths of schooling, these differences may be due at least in part to differences in age. Equally, of course, differences in performance found amongst children of different ages may be due to differences in the amount of schooling they have received as well as to the fact that some are older than others.

First Investigation

In the endeavour to sort out some of the intricacies of this problem the Foundation carried out two small investigations. A number of primary schools assisted in these studies and their help and co-operation is gratefully acknowledged.

The first investigation was carried out in a Junior school in which the children were streamed by age—that is, they were grouped in classes according to age in the contributing Infant school and the Junior Headmaster accepted these groupings and maintained them throughout his school. In order to obtain a measure of performance, all the children in each of the four years of the Junior school were given, in the Spring Term 1959, the Foundation's Sentence Reading Test 1. The median raw and standardised scores together with mean ages and age ranges of the four year groups are given in Table I.

Table I

MEDIAN SCORES BY YEAR GROUP

Year	Classes	No.	Age Range	Mean Age Yrs. Mths.	Median Raw Score	Median Stand. Score
1st	1 & 2	62	7:5— 8:4	7 10.02	10.00	93.30
2nd	3, 4 & 5	87	8:5— 9:4*	8 10.80	13.38	89.40
3rd	6, 7 & 8	104	9:5—10:4	9 10.91	26.00	100.00
4th	9 & 10	80	10:4—11:4	10 9.74	28.15	99.50

*one child of 9:9

Class 5 was an exception to the rule of 'streaming' by age since it contained all the poor readers from the 2nd year group.

The standardised scores (mean 100, S.D. 15) contain an age allowance determined from the sample on which the test was standardised. The median standardised score for each year group was then used to determine what would be the expected median raw score for each class within the year group. This expected median raw score was then compared with the observed median raw score. If the classes had been grouped by age only—that is, within each class there was a full range of ability—then the observed and expected median raw scores should be approximately the same. Similarly, of course, the median observed standardised score for each class within a year group should be approximately equal to that for the year group as a whole. The results are given in Table II. In order to complete the analysis the children from Class 5 were distributed into Classes 3 and 4 according to their age.

Table II

MEDIAN SCORES BY CLASS GROUPS

Class	No.	Age Range	Mean Age Yrs.	Mean Age Mths.	Expected Median Raw Score	Observed Median Raw Score	Observed Median Stand. Score
1	31	7:5— 8:0	7	7.26	8.46	9.25	96.38
2	31	7:8— 8:4	8	0.77	12.05	12.25	96.00
3 & 5	50	8:5— 9:1	8	8.50	12.26	8.83	84.50
4 & 5	37	8:9— 9:4*	9	1.92	14.66	20.88	98.88
6	36	9:5—10:4	9	8.36	24.94	19.50	91.50
7	34	9:6—10:4	9	10.44	25.65	25.83	101.00
8	34	9:9—10:4	10	2.09	26.70	28.50	104.00
10	39	10:4—11:3	10	8.44	28.05	26.13	94.67
9	41	10:6—11:4	10	10.98	28.39	29.60	103.67

*one child of 9:9

It will be seen from Table II that there was not a great deal of discrepancy between expected and observed scores for Classes 1 and 2 in the first year group. The observed scores for Class 3, however, are well below expectation, while those for Class 4 are well above. The difficulty with Class 5 may have contributed to this discrepancy, but the same phenomenon occurs with the three classes in the 3rd year group and also with the two classes in the 4th year group.

However, it will be seen that the age 'streaming' is by no means exact—there is considerable overlap in the age ranges for each class in a year group. This was due to the presence of a few children only and therefore the results for the 3rd year group were re-calculated and the analysis confined to those children falling within a five month group in each class. The results are given in Table III.

Table III

MEDIAN SCORES FOR 3RD YEAR GROUP

Over-all Mean Age 9 years 10.77 months; Median Raw Score 26.86; Median Stand. Score 102.00

Class	No.	Age Range	Mean Age Yrs.	Mean Age Mths.	Expected Median Raw Score	Observed Median Raw Score	Observed Median Stand. Score
6	29	9:5— 9:9	9	7.10	25.56	22.00	95.25
7	31	9:8—10:1	9	10.52	26.56	26.00	101.67
8	31	10:0—10:4	10	2.45	27.61	29.63	108.67

It is still clear from the figures in Table III that Class 8 is doing considerably better than their average age indicates and Class 6 not as well.

A satisfactory explanation for these differences could not be found in any differential treatment of the various classes within a year group. That is to say, all classes within a year group in the school were treated as ' parallel ' and a careful balance of the teaching strength was always maintained. Indeed the only plausible explanation seemed to be one associated with the length of schooling. Information was obtained on this variable for most of the children in the 3rd year group and this showed that for the most part Class 6 had received 13 terms previous schooling and Class 8, 15 terms.

It must be made clear that this investigation was carried out in only one school and a relatively small number of children were concerned. However, the results showed that in a school where children were ' streamed ' by age, older children scored higher on the average on a reading test than might have been expected according to their age, while younger children did not perform as well. Furthermore, the findings were in the direction expected from the hypothesis that an extra term or two of schooling would result in improved performance.

Second Investigation

Following an article in an earlier issue of this Journal on the *Effects of Streaming** a number of primary school head teachers interested in this topic wrote to the Foundation expressing their willingness to co-operate in any relevant research. Although the problem

*Vol. II, No. 1, November, 1959.

of length of schooling was distinct from that of streaming, these schools together with others, readily agreed to participate in a further investigation which, it was hoped, would provide more definite evidence. Six Junior schools in all were asked to administer Sentence Reading Test 1 to all children in their four year groups, and to obtain for each child a record of the number of completed terms previous schooling up to the time of testing. A total of 1,604 children were tested and the relationship examined between reading performance and the number of terms previous schooling.

Before considering any effect due to the age of the children, it was found that, within schools, there was a highly significant regression effect of raw scores on the reading test, on the number of terms previous schooling. Using this regression the expected mean reading scores for given lengths of schooling may be calculated and the results of this are given in Table IV.

Table IV

RELATION BETWEEN THE NUMBER OF TERMS PREVIOUS SCHOOLING AND RAW SCORE ON SENTENCE READING TEST 1

No. of terms previous schooling	8	10	12	14	16	18
Expected raw score on S.R.1.	13.32	16.23	19.15	22.07	24.99	27.91

Quite clearly reading test performance is affected by the length of previous schooling. After the effects of the age of the children has been eliminated, however, the regression of test score on length of schooling becomes statistically non-significant (taking the usual 5% significance level). The predicted reading scores for different number of terms schooling *after the elimination of the age effect* are given in Table V.

Table V

RELATION BETWEEN THE NUMBER OF TERMS PREVIOUS SCHOOLING AND RAW SCORE ON SENTENCE READING TEST 1 AFTER ELIMINATING EFFECTS OF AGE

No. of terms previous schooling	8	10	12	14	16	18
Expected raw score on S.R.1.	17.98	18.97	19.96	20.95	21.95	22.94

A comparison of Tables IV and V shows that the change in score that may be expected for an increase of one term's schooling has decreased from approximately 1.46 to 0.50 points of score, when age is eliminated. This second figure is no longer large enough to be described statistically as significantly different from zero.

The regression analysis was also carried out on the results for each school separately. It was found that the regression of reading score on length of schooling remained statistically significant, after the elimination of age, in only one of the six schools. This was a large three-stream school which, for the most part, ' streamed ' by age within each year group. The regression for this school was found to be significant at the 5% level, while the results for the remaining five schools agreed with those obtained on the total.

These results indicate that while length of schooling is obviously related to reading performance ($r = 0.539$) there is such a close correspondence between length of schooling and age ($r = 0.979$) that, to allow for age when considering test score also allows for differences in length of schooling.

This analysis seemed conclusive enough; there remained the possibility, however, that any residual effect from the length of schooling might only be apparent during the early years of the Junior school and that by carrying out analyses over all four years the effect was masked. These regression analyses were repeated, therefore, covering the first two and the last two years of the Junior school separately. Two schools were omitted from these calculations, since their data were incomplete.

The first repeat analysis was carried out on the first and second years of the Junior school. Before the ages of the children were considered, it was again found that, within schools, there was a highly significant regression of raw reading score on the number of terms previous schooling. However, when the effect of the ages of the children was removed, it was found that no statistically significant regression remained.

This regression analysis was also carried out on the first two years of each school separately, but the same result was found for each. Thus it is clear that variations in length of schooling have no residual effect on reading performance during the first two years of the Junior school once the effects of differences in age are allowed for.

For the third and fourth years the regression of reading score on the number of terms previous schooling was also highly significant before age was considered. When the effects of age were eliminated, again the regression was no longer statistically significant. The repeat of the analysis for each school separately, however, gave results for two of the schools which agreed with those for the totals, but for the other two schools the number of terms previous schooling still had a significant effect on reading scores, even after the elimination of age.

It will be recalled that most of the schools participating in the investigations were interested in the problem of streaming and in fact only one of the four schools in the last analyses was streamed by ability. In this school there was no residual effect of length of schooling. One other school practiced no streaming at all. It was a large school and except for one ' fast ' class in both the third and fourth years, in all other classes the children were grouped at random. This school also showed no residual effects of length

of schooling. In the other two schools, however, streaming, not by ability but by age, was practiced and in both these schools the residual effect of length of previous schooling on reading performance was significant after the elimination of age. It is interesting to note that this result agrees with the first investigation reported above, in which the school concerned also streamed by age.

Discussion of Results

The number of schools participating in this investigation was fairly small and since the results seem to depend upon the type of streaming practiced in each school the findings must be reviewed with caution. There appears to be evidence, however, to suggest that under the usual circumstances pertaining in most schools, if due allowance is made for the age of each child when tested, then due compensation will also be given for any differences that might exist in length of previous schooling. Where the practice of grouping children into classes according to their age is adopted, the evidence from both investigations reported here suggests that even after due allowance is made for the age of the children, their reading performance still varies according to the length of previous schooling they have received, although this residual effect appears only to be noticeable during the latter part of the Junior school.

The explanation of these results is not easy to find. The fact that this residual effect only appears in the latter part of the Junior school makes the hypothesis that it is due purely to length of previous schooling questionable. If the latter is to have an effect on test scores after age has been considered, then it would surely be more noticeable with younger children, that is, in the early years of the Junior school. It will be observed, however, that under these circumstances of 'streaming' by age, the older children in a year group, who happen also to be those who have received a longer schooling, perform better than is expected of children of their age, while the younger children in the year group perform below the expectation for their age. The possibility must be considered, therefore, that the differential performance effect is not due to any differences in length of schooling, but to the fact that the children are 'streamed' by age. Some evidence has already been obtained that one of the effects of streaming is to increase the 'spread' of test performance*. That is, under the circumstances of ability streaming, more high scores and also more low scores are produced than would be the case were the children not streamed.

The suggestion here is that since older children of a year group will be doing more advanced work than the younger ones, simply by reason of their age, an older stream will give the appearance of being 'better' than a younger stream. This in turn may result in the tendency, as with ability streaming, of advancing the older children and retarding the younger ones. Since this 'advancing' and 'retarding' would be cumulative it is possible that its effect would not be noticed during the early years in the Junior school, but it would become more apparent as children reached the third and fourth years.

---

*A Comparative Study of Basic Attainments. Educational Research, Vol. I, No. 1.

Although the evidence from the investigations reported here would support such an hypothesis as this, it should be made clear that it by no means confirms it. Clearly, considerably more evidence is required. During the Foundation's 1960 National Survey, information on the number of terms previous schooling has been obtained from representative samples of 7-8 year old children in England and Wales together with the children's performances on a number of arithmetic and reading tests. A full examination of this data may well throw some further light on this question. Still further evidence will be required, however, especially from Junior schools where children are streamed by age within each year group. If any Junior school which practices age streaming is interested in co-operating in a further enquiry, the Foundation's staff would be willing to organise it and to analyse and report the results.

Research Note:

THE IMAGE OF TECHNICIAN OCCUPATIONS AMONG SCHOOL-LEAVERS

by Stephen Cotgrove
Senior Lecturer in Sociology, The Polytechnic
and Frank Barr
Senior Lecturer in Education, Huddersfield Technical Teacher Training College

In recent years, there has been a growing recognition of the importance for industrial advance of the middle range of qualified manpower, above the level of craftsmen, but below that of technologist. Moreover, a number of enquiries have shown that the shortages in this range of technician occupations are comparable to those at the higher levels. A shortage of qualified draughtsmen appears to be particularly acute.

There are, however, a number of factors which may be influencing recruitment to this type of occupation. No clear channels of recruitment and training exist for technicians in industry comparable to apprenticeship for craftsmen. Indeed, it is only in the last few years that the word technician has come to be used to identify such occupations. Previous enquiries[1] have shown that school children lack vocational knowledge. It could be expected, therefore, that they might be even less informed about technician occupations. The following report summarises the main findings of a small pilot enquiry to discover the 'image' of technician occupations among school-leavers.

The Enquiry

Three schools co-operated in the research: one comprehensive, a secondary technical and a secondary modern. Replies were received from 149 boys in their final year at school, of whom 85 were in a secondary technical school or in technical streams, 33 in grammar and 31 in modern streams. The total sample is, therefore, likely to be rather more interested in, and better informed about, technical occupations than the total population of school leavers.

A majority of the school-leavers in the sample had already chosen a career in industry, and of these 20% had chosen draughtsmen or engineering apprenticeships, while a further 12% aimed at the professional technologist level (see Table I).

[1]For a summary of previous enquiries into vocational interests, see "Interest Testing in Educational and Vocational Guidance," S. Weigersma & F. Barr, *Educational Research*, Vol. II, No. 1, 1959.

Table I
Choice of Occupation Analysed by Streams

	All %	Grammar %	Technical %	Modern %
Apprenticeship—trade	13	—	19	10
—technician	20	3	33	3
Non-apprenticed learner	24	21	17	45
Professional—Sci./Tech.	12	28	8	3
—business	4	6	4	3
Clerical	12	30	8	3
Miscellaneous	15	12	11	33
	100 (147)	100 (33)	100 (83)	100 (31)

A series of questions and tests was devised to explore the image of technician occupations among the sample. In a word-association test, the words most frequently checked as applicable to such occupations were 'qualified,' 'interesting,' 'brain-work.' A majority (75) thought of the technician as a man in a white coat, compared with 33 whose image was of blue overalls. But 70 also thought that he worked with his hands. The social-class position of the technician seems, however, to be ambiguous. Opinions were equally divided in calling him middle class (41) and working class (42). But when asked to rank 7 occupations in order of status and pay, draughtsmen were ranked second in both cases (Table II).

Table II†
Occupations ranked in order of pay and status

	Pay	Status
Civil Servant (exec.)	1	1
Draughtsman	2	2
Insurance Agent	3	5
Laboratory Technician ..	4	4
Carpenter	5	6
Primary School Teacher ..	6	3
Wages Clerk	7	7

Rank order correlation = 0·77

†Three occupations (civil servant, insurance agent and teacher) were included to make possible comparison with the Hall-Jones enquiry into the ranking of occupations (see D. V. Glass, *Social Mobility in Britain*, Ch. 2). The relative order of ranking of these occupations by the sample of school-leavers corresponds to the adult ranking. For a report of a more detailed study, see H. T. Himmelweit, A. H. Halsey and A. N. Oppenheim, "The View of Adolescents on some Aspects of Social Class Structure." *Brit. Journal Soc.*, Vol. III, No. 2, 1952.

This generally favourable image is confirmed by the replies to a sentence completion test. The majority thought technicians to be well or highly paid (65% of responses). 56% thought of technicians' jobs as skilled, intelligent, qualified, interesting, while 75% thought that in ten year's time, technicians would be better/highly paid.

Broad occupational interests and preferences were explored by asking, " If you had to choose between a job in either list *a*, *b*, or *c* below, which would you choose?" The lists comprised:—

(*a*) Clerical and office occupations (e.g., bank clerk, railway clerk);

(*b*) Technician (e.g., draughtsman, maintenance engineer);

(*c*) Skilled trades (e.g., carpenter, bricklayer).

The majority (61%) stated a preference for the technician list; the rest were equally divided between office jobs and trades. About the same proportions also ranked jobs in the technician list as most interesting, secure, useful and worthwhile, although trades were ranked rather higher than office jobs as useful and worthwhile. The final question asked was " For which list of jobs do you think it is most important to go to evening classes if you want to get on?" Here 70% stated the technician list, 25% the trade list, but only 5% office and clerical jobs.

There were however some differences between streams. Table III shows that although a majority in all streams ranked technicians' jobs as the most interesting and secure, the technical streams ranked them most often as interesting, and the modern streams as the most secure.

Table III

Image of occupations analysed by streams

	Grammar		Technical		Modern	
	Interesting %	Secure %	Interesting %	Secure %	Interesting %	Secure %
Office/clerical	33	19	6	21	7	11
Technicians	58	69	80	53	57	75
Skilled crafts	9	12	14	26	36	14
	100	100	100	100	100	100
	(33)	(32)	(80)	(77)	(28)	(28)

More boys had stated a preference for technician jobs than had decided to enter technician apprenticeships, and such occupations were ranked high for interest, pay and security. What reasons then were given by those who did not state a preference for the technician list? By far the most frequent type of explanation was "too educated for me," "need a lot of study," "I could not do that," "too brainy," "science weak subject," "good jobs but too many exams."

This image of technician occupations as those which require study and qualifications was explored by a series of questions as to the type of education and qualifications necessary for such jobs. 90% thought that technicians will have attended classes after leaving school, and two thirds thought that this would mean part time study at a technical college. Most had heard of National Certificates, City and Guilds, and the B.Sc. degrees, but only half had heard of a Dip.Tech. Most thought that the ONC was harder than G.C.E. 'O' level. G.C.E. 'O' level was mentioned most often as the qualification likely to be possessed by the average technician. But there were interesting differences between streams. The modern stream sample mentioned National Certificate and City and Guilds much less than the total sample (9% of replies compared with 43%), but believed G.C.E. to be the qualification of the average technician much more frequently (69% compared with 41%). The technical stream on the other hand mentioned national certificates and C. & G. more frequently (59%) and G.C.E. less frequently (26%).

Finally, as entry to technician jobs is usually via apprenticeship, attitudes towards this form of entry to occupations were explored. About two-thirds of the sample were prepared to become apprenticed. But again there were marked differences between the streams. While 77% of the technical streams were favourable, only 21% of the grammar streams would enter on apprenticeship. Among the main reasons given by those who favoured apprenticeship, most stressed the training which was achieved, followed by the better chances of getting on. Those who were opposed referred to the low pay and being 'tied down' in apprenticeships.

It can be seen that for this particular sample of school leavers, technician jobs are ranked highly in terms of pay, status, interest and educational achievement. The image is, if anything, rather too favourable. Recent enquiries show that in fact only about half the technicians employed in industry have an educational qualification[2]; while the average pay of those holding an HNC is little higher than that for skilled craftsmen[3]. But the sample used in this inquiry included a large proportion of boys in secondary technical streams; and on several issues, it has been shown that their replies differed from those of grammar and modern streams. Are there, then, any specific factors which can be shown to account for these differences between streams?

The size of the sample does not justify any very refined analysis of the variables, but some differences are sufficiently great to be significant. Table IV shows job preferences analysed by streams. The preference of the technical streams for technical jobs and of the grammar streams for office and clerical jobs is very marked.

---

[2]S. F. Cotgrove, "Technicians in Industry." *Technology*, Nov.-Dec., 1960.

[3]G. Thomas, *The Higher National Certificate*, 1952. *Central Office of Information*, August, 1960.

Table IV
Occupational preference analysed by streams

	Grammar %	Technical %	Modern %
Office, clerical	53	11	8
Technician	41	71	56
Skilled crafts	6	18	36
	100 (32)	100 (82)	100 (25)

This does not tell us of course, what factors led the boy to choose a technical stream in the first place. It may be that entry into a technical course stimulates vocational interests, or possibly that only those whose interests lie in the direction of careers in industry choose to enter the technical streams. Choice of streams cannot be explained by any simple association with fathers' occupations. Indeed, a much higher proportion of boys in the technical than in the grammar streams were the sons of men in business and clerical occupations (Table V).

Table V
Streams analysed by Fathers' occupations

Fathers' Occupations	Grammar %	Technical %	Modern %
Non-manual:			
Industrial/technical	40	25	6
Business/clerical	18	30	6
Manual:			
Skilled	24	35	49
Other	18	10	39
	100 (33)	100 (81)	100 (31)

Further study would be necessary to explore how far the grammar and technical stream curricula are themselves responsible for generating the occupational interests and evaluations which have been demonstrated.

Summary and discussion

The sample of boys in their last year at school ranked technician occupations highly, relative to office and craft occupations. The typical image of the technician is of a man in an interesting, well paid, secure occupation, held by an educationally qualified man. Indeed, the educational requirements believed to be necessary are, for some, a barrier to entry. By comparison with actual conditions in industry, this image exaggerates somewhat both the pay and the qualifications of typical technicians.

There were, however, important differences between streams. Although all streams ranked technician occupations highly by the various criteria, a majority of the grammar school stream would prefer a job from the clerical/business list, and only 3% had actually chosen to enter a student/engineering apprenticeship (compared with 33% of the technician stream). A higher proportion of the technical streams thought of National Certificates and C. & G.'s as typical technician qualifications. The technical streams stood out as ranking technician occupations more highly, being better informed on their educational requirements, and as having more often chosen to enter such occupations.

Several tentative conclusions may be suggested. The proportion having chosen to enter technician occupations is small compared with what might be expected from the favourable image towards them (Table I). The reasons for this are not clear, but it does indicate that a very substantial potential supply of technicians exists. It should also be noted that only 21% of the grammar school stream were prepared to enter an apprenticeship—the typical means of entry to many technician occupations.

The very marked orientation towards technician jobs to be found in the technical streams is perhaps to be expected from previous studies. But how far this is due to the curriculum in the technical streams, or how far such an orientation itself determines the entry to technical streams is a problem which requires further study.

Bibliography:

THE TEACHING OF ENGLISH LITERATURE IN SECONDARY SCHOOLS

by M. K. Paffard

Department of Education, University College of North Staffordshire.

This list is supplementary to Sheila Bate's bibliography " The Teaching of English in Secondary Schools " published in *Educational Research*, Vol. II, No. 3, June 1960, in which language was emphasised rather than literature. Many general books on the teaching of English mentioned in her list contain useful sections on the teaching of literature and these references are not repeated here.

For reasons of space this is necessarily a *select* bibliography. The titles are roughly grouped under headings and in each group I have attempted to include all the more useful and up-to-date books known to me, though no guarantee is offered that all the titles are still in print or easily obtainable. It has proved impossible to draw a hard and fast line between, on the one hand, methodological books written for teachers or students of education and, on the other hand, more general books on literature, school text books, and books written for young readers. Books in the second category are very numerous and I have tried to select those which seemed to me sufficiently useful or original in approach to justify their inclusion.

Articles are not included: they are so numerous that a selection within a reasonable compass would inevitably seem arbitrary; instead, a list of the most useful periodicals and a bibliographical section are included. I should have liked to include a section devoted to books on the mass media of communication through whose channels so much literature nowadays reaches children and adults alike. This has proved impossible for reasons of space alone and not because the subject does not seem to me of the greatest importance. I hope to expand on this and other controversial points in a subsequent number of *Educational Research*.

I have commented on a book in this bibliography only when this seemed desirable because of its importance or necessary because its title might be misleading. My comments attempt to be factual rather than evaluatory, indicating the scope or central thesis of the book as briefly as possible. The inclusion of a title at all is an indication that I consider it to have some measure of value and relevance for teachers of English in secondary schools.

Throughout, readers are bound to find omissions which seem to them serious: these may or may not be deliberate, and I should welcome correspondence on the subject as it may prove possible to publish a list of addenda at a later date.

I am grateful to Mr. Ian Michael of Bristol University for a number of valuable suggestions.

BIBLIOGRAPHIES AND BOOKS ABOUT CHILDREN'S BOOKS

A Guide to Booklists and Bibliographies for the use of School Librarians. W. L. SAUNDERS. School Library Association, 1956.

General Reference Books suitable for School Libraries. School Library Association, 4th edn., 1954.

Eleven to Fifteen. A basic book list of non-fiction for secondary school libraries. School Library Association, revised 1957.

Modern Adult Fiction for School and College Libraries. N. CULPAN. School Library Association, 1955.

Children's Books of the Century. Library Association, 1958.

Chosen for Children. Library Association, 1957.

Books for Young People 11-13+. Library Association, 3rd edn., 1960.

Four to Fourteen. KATHLEEN LINES. Cambridge U.P., 1956.

Children's Books in England. F. J. HARVEY DARTON. Cambridge U.P., 2nd edn., 1958.

About Books for Children. DOROTHY NEAL WHITE. Cambridge U.P., New York, 1949.

Tales out of School. GEOFFREY TREASE. Heinemann, 1948.

A Critical History of Children's Literature. Ed. Carnelia Meigs. Macmillan, New York, 1953.

Twentieth Century Children's Books. F. EYRE. British Council: Longmans, 1952.

The 100 Best Books for Children. *Sunday Times*, 1957.

Recent Historical Fiction for Secondary School Children. K. CHARLTON. Teaching of History Leaflet 18. Historical Association, 1960.

Tellers of Tales. R. L. GREEN. E. Ward, revised 1946.

Books, Children and Men. HORN BOOK n.d.

Books for Children. P. PARROTT. National Book League, 1955.

The Unreluctant Years. L. H. SMITH. A.L.A. (Woolston), 1954.

Books for Young Readers. Second edn., revised and annual supplements. Woodfield and Stanley, 1956.

School Libraries. A short manual. C. A. SCOTT. Cambridge U.P., 1955.

Running a School Library. A. NEIL. Collins, 1957.

PERIODICALS

(Addresses are for subscription rather than editorial)

The Use of English. Ed. Denys Thompson. Chatto and Windus, 40, William IV St., London, W.C.2. Quarterly (17/6 p.a.)

Invaluable for its articles and reviews. The only journal published in this country devoted exclusively to the teaching of English.

English (Literature, Criticism, Teaching). The Journal of The English Association. Oxford U.P. Neasden, London, N.W.10. Quarterly (14/- p.a.)

Some useful articles and reviews.

The School Librarian. The Journal of the School Library Association. 29, Gordon Square, London, W.C.1. Thrice yearly (16/6 p.a.)

Particularly valuable for its reviews of children's books. The Association also publishes very useful bibliographical and other pamphlets.

Exercise Exchange. Rinehart and Co., 232 Madison Av., New York, 16. Quarterly (1 dollar p.a.)

An American journal "for the interchange of classroom ideas among teachers of composition and literature." Mainly High School and College level. Lively and practical.

The Critical Quarterly. Ed. C. B. Cox and A. E. Dyson. Oxford U.P., Amen House, Warwick Square, London, E.C.4. Quarterly (12/- p.a.)

Many of the articles could be useful at Sixth Form level. Mainly devoted to 20th Century Literature. Refreshingly unponderous for an academic journal and could help to keep the teacher in touch with the literary scene and critical trends.

College English. Published in America by The National Council of Teachers of English, 508, South Sixth St., Champaign, Illinois. Monthly from Oct. to May. (4 dollars p.a.)

The Council also publishes **The English Journal** which is mainly devoted to English teaching in junior grades.

In addition many literary and educational periodicals occasionally publish material specifically relevant to the Secondary School English teacher. The following are among the most useful:

The Times **Educational Supplement.**

The Times **Literary Supplement.**

The Listener.

Books. The journal of The National Book League. 7 Albermarle St., London, W.1.

British Book News. Published for The British Council, 65 Davies St., London, W.1.

Books and Bookmen. Hansom Books, 21 Lower Belgrave Street, Buckingham Palace Road, London S.W.1.

Plays and Players. Hansom Books (as above).

Drama. British Drama League. 9 Fitzroy Square, London, W.1.

Speech and Drama. Society of Teachers of Speech and Drama. Hon. Sec., Oakhurst, Steep, Petersfield, Hants.

Educational Theatre Journal. American Educational Theatre Association. Artcraft Press, 10 Watson Place, Columbia, Missouri.

World Theatre. Published in French and English by International Theatre Institute under the auspices of U.N.E.S.C.O. Olivier Perrin, 198 Boulevard Saint Germain, Paris.

Athene. Journal of the Society of Education through Art. 37 Denison House, 296 Vauxhall Bridge Rd., London, S.W.1.

The Poetry Review
The Voice of Youth } Published by the Poetry Society, 33 Portman Square, London, W.1.

Sight and Sound. Published by the British Film Institute, 164 Shaftsbury Avenue, London, W.C.2.

The London Magazine. 58 Frith Street, London, W.1.

The Twentieth Century. 26 Bloomsbury Way, London, W.C.1.

Encounter. 25 Haymarket, London, S.W.1.

Researches and Studies. The Institute of Education, The University, Leeds, 2.

Educational Review. The University, Edmund St., Birmingham, 3.

The British Journal of Educational Studies. Faber and Faber.

The British Journal of Educational Psychology. Methuen.

Essays in Criticism. Blackwell.

LITERATURE AND EDUCATION (General)

English for Maturity. DAVID HOLBROOK. Cambridge U.P., 1961. Part I. English in the Secondary School. Part II. The Practice of Teaching English.

Written primarily for teachers in secondary modern schools who " are helping to train the sensibility of three quarters of the nation " and " create its capabilities for living and its potentialities as an audience for new forms of literary expression." Valuable appendices and bibliography.

The Use of Imagination: Educational thought and the literary mind. WILLIAM WALSH. Chatto and Windus, 1959.

The author's thesis is that the one essential professional qualification for a teacher is that he be educated and that no one can be considered educated who has not come under the supremely civilizing influence of literature. He discusses a series of educational themes through an examination of the work of Coleridge, Wordsworth, Hopkins, Twain, James, de la Mare, Lawrence and Eliot while not forgetting that literature is literature and not an illustration of educational ideas.

The Abolition of Man: Reflections on education with special reference to the teaching of English in the upper forms of schools. C. S. Lewis. Riddell Memorial Lectures 1943. Geoffrey Bless, 1947.

A most important discussion. The author points to the dangers of using a commonplace, destructive rationalism or the ill-digested methods of philosophical linguistic analysis to attack propaganda and other forms of persuasive and sentimental writing. The two books he examines pseudonymously are **The Control of Language,** Alec King and Martin Ketley, Longmans Green, first published 1939 and **The Reading and Writing of English,** I. A. Biaggini, Hutchinson, 1936.

Education and the University. F. R. Leavis. Chatto and Windus, 1943.

" A sketch for an ' English School '." Concerned with making the study of literature a discipline, not of scholarly industry and academic method, but of intelligence and sensibility. A most important contribution on a problem that concerns the secondary school teacher, who is largely bound by examination syllabuses, no less than the university don.

Theory of Literature. René Wellek and Austin Warren. Harcourt, Brace and Co., N.Y., 1942.

" . . . might have been called theory of Literature and Methodology of Literary Study." Attempts " to unite ' poetics ' (or literary theory) and ' criticism ' (evaluation of literature) with ' scholarship ' (' research ') and ' literary history ' (the ' dynamics ' of literature, in contrast to the ' statics ' of theory and criticism)."

The Education of the Poetic Spirit. Marjorie L. Hourd. Heinemann, 1949.

"A study in children's expression in the English lesson." The author is concerned with the place of imaginative experience through literature in the child's whole mental and emotional growth and discusses dramatisation and creative writing as well as the reading of literature. She is critical of some aspects of ' centres of interest ' methods and of A. J. Jenkinson's conclusions about children's reading. Her arguments are extensively illustrated from the work of girls in a Public Day School.

Coming into their Own. Marjorie L. Hourd and Gertrude E. Cooper. Heinemann, 1959.

" A study of the idiom of young children revealed in their verse writing." In her commentary on a collection of verse written by a class of ten-year-olds Miss Hourd links together problems connected with literature, pedagogy, and the psychology of child development.

Language and Reality. M. Hope Parker. Frederick Muller, 1949.

" A course in contemporary criticism." Concerned with the modern artist's attempt to rescue words and their capacity to mean from " the general mess of imprecision of feeling "; with " the relation between life and language; with the nature of values and the what, why and how of critical technique."

Culture and Environment. F. R. Leavis and Denys Thompson. Chatto and Windus, first edn., 1933.

"The training of critical awareness." A pioneering attempt to resist the increasing pressures of mass communication and industrial urban living in the interests of education.

Reading and Discrimination. Denys Thompson. Chatto and Windus, first edn., 1934.

Intended "to provide a start in the training of discrimination in reading, and in the forming of judgements at first hand, by the examination of some kinds of good and bad literary experience." The first and still one of the best attempts to apply I. A. Richards' ideas in "Practical Criticism" for classroom use.

The Critical Sense. James Reeves. Heinemann, 1956.

Practical criticism of prose and verse for sixth forms. Provides a brief background of critical theory and a glossary of literary terms with passages of prose and verse for study.

Fiction and the Reading Public. Q. D. Leavis. Chatto and Windus, 1939.

Concerned with "the fiction that does not happen to be, or to have become, literature as the novels which ultimately get into the text books," and which culturally is of the greatest importance. This study preceded the work of A. J. Jenkinson and Richard Hoggart (see Miss Bate's bibliography) and indirectly throws much light on the kind of reading children are likely to do outside the classroom.

The Seduction of the Innocent. F. Wertham. Museum Press, 1955.

A study by a psychiatrist of the effects of 'comics' on children in America.

Young Writers, Young Readers. Ed. Boris Ford. Hutchinson, 1960.

Part I. An anthology of children's writing. Part II. Essays by various hands mainly on writers and writing for children. Part III. A valuable list of recommended books for children.

The Importance of Illiteracy. M. M. Lewis. Harrap, 1953.

A shrewd analysis of a major social problem about which there is much confused thinking and anxiety within the teaching profession and by the public at large.

Reading English. Seary and Story. Macmillan, 1959.

Common sense advice to the freshman reading English much of which is applicable to sixth formers.

The Muse in Chains. Stephen Potter. Jonathan Cape, 1937.

"A study in Education." A revealing and witty historical survey of the study of English literature as an academic discipline with much shrewd criticism of its abiding absurdities.

The Active Teacher: Training and Assessment. J. ELIZABETH RICHARDSON. Routledge, 1955.

" The first part of the book is concerned with the handling of speech problems in general and the second part with the training of English specialists in particular . . . Emphasis has been laid on the role which a teacher plays in the classroom and on the way in which recording apparatus . . . enables the student to examine his own performance in this role."

Teaching English through Self-expression. E. J. BURTON. Evans n.d.

" A course in Speech, Mime and Drama ": the author believes that " speech and dramatic work should be a basis for written work and a stimulus to literary study."

English for Pleasure. L. A. G. STRONG. Methuen, 1941.

Based on a series of broadcast talks to schools which touch on many aspects of reading and writing.

Creative English. GORDON TAYLOR. Arnold, 1958.

POETRY

On Reading Poetry. AUBREY DE SELINCOURT. Phoenix House, 1952.

A short book written simply but without condescension by an outstanding teacher. Fresh, wise and persuasive, its great virtue is that it does not shirk the most difficult problems of definition.

Poetry and Children. Prepared by the Central Committee on the Teaching of English in the East and West Ridings of Yorkshire. Methuen, 1956.

Contains chapters dealing with ' teaching ' poetry to all age groups from the infants' school to eighteen, descriptions of various experimental methods of interesting children in poetry and some useful appendices.

Poetry for You. C. DAY LEWIS. Blackwell, 1944.

Written for children to accompany his anthology **The Echoing Green** but can well stand on its own. His answers to questions like " What is the use of poetry?" (Ch. I.) or " When is a poem not a poem?" (Ch. IX) are likely to be particularly useful to the teacher and the whole book could be used as the basis for discussion in class.

The Appreciation of Poetry. P. GURREY. Oxford U.P., 1935.

The book is " an investigation into the nature of ' appreciation ' of poetry, primarily for the guidance of students and teachers of literature." It exposes the unsoundness of the conventional methods of poetry teaching which relied on scansion exercises, rote learning, and learning the technical terms of prosody, verse forms and figures of speech and attempts to put something sounder in their place.

Poetry without Tears. MICHAEL BALDWIN. Routledge and Kegan Paul, 1959.

A forthright and often entertaining survey of the problems of selecting and presenting poetry to children. He argues that the surest road to appreciating poetry is through writing it and quotes a selection of children's work.

Poetry in the Sixth Form. Compiled by The Society for Teachers of English. Ed. George Whitfield. Macdonald, 1950.

" . . . the full appreciation of a poem demands an effort of attention which can be helped in various ways which are suggested in this book." A number of sample lessons are given. Useful bibliography.

Teaching Poetry. (Poetry in class, five to fifteen). JAMES REEVES. Heinemann, 1958.

Part I contains chapters on the choice of poems and methods of presenting them to children of different age groups. Part II attempts to answer the question " Why teach poetry?" and comments on some of D. H. Lawrence's ideas about inspiration, the irrational and the sense of wonder.

Poetry in Practice. Some suggestions of teachers. NORMAN CALLAN. Ernest Benn, 1938.

Chs. 1-2, a discussion of the difficulties that appear in dealing with poetry for children. Ch. 3, a plan of reading and writing poetry for younger children. Chs. 4-6, more advanced study.

The Poets' Craft. A. F. SCOTT. Cambridge U.P., 1957.

" A course in the critical appreciation of poetry based on the study of holography manuscripts, earlier and later versions of printed poems, transpositions of prose into verse and contrasted translations."

Speaking Poetry. GEOFFREY CRUMP. Methuen, 1953.

About those aspects of poetry that particularly concern the speaker including a chapter on the technical use of the voice. The author believes that " the arts can flourish only when there is a healthy tradition of interpretative as well as creative activity."

The Rudiments of Criticism. E. A. GREENING LAMBORN. Clarendon Press, Oxford, 1951.

Though originally published in 1916, it has a lot to recommend it still. " . . . a simply written introduction to the study of poetry such as might be put into the hands of young students to show them what to look for and to prevent them falling at the outset into the fatal error of reading poetry for the substance and not the form of its matter."

Poetry and the Teacher. T. W. SUSSAMS. T. Nelson, 1949.

Discusses the teaching of poetry in schools and the place of poetry in education; offers suggestions for the improvement of techniques of presenting and choosing poetry for children in the light of surveys made by the author of children's opinions; attempts " to be as scientific as possible in what is, after all, largely an essay in aesthetics . . . where human factors are so inextricably entangled."

Approach to Poetry. JOHN F. DANBY. Heinemann, 1940.

Divided into three sections: The study of poetry; The doing and saying of poems; The study of poems. " It is often assumed that the poetry lesson calls for ' gush,' . . . actually the opposite is the case: the poetry lesson demands, if anything, a dry, wary, emotionally spare technique." Plenty of concrete examples of the kind of disciplined reading and activity on which the author believes true ' appreciation ' is built.

Adventure into Poetry. F. J. ARNSTEIN. Stanford University Press, California, 1951.

A book about the author's methods of enticing creative work from young children. Informed throughout by the conviction that " guided self-expression opens up important paths not only to cultural living but also to learning, to morality and to health."

The Criticism of Poetry. S. H. BURTON. Longmans, Green, 1950.

Based on the conviction that " true appreciation cannot be divorced from a knowledge of critical technique." The development of such appreciation and such technique is invariably accompanied by a growth in the power of self-expression, and a delight in the characteristic virtues of the English language." Deals with meaning, style, tone, intention, versification, prosody, diction and imagery with plenty of material for practice.

Feet on the Ground. An approach to modern verse. MARGARET J. O'DONNELL. Blackie, 1946.

" The aim of this book is to shift the emphasis from the poet to the reader of poetry." The attempt is to approach poetry " reasonably and scientifically, and as awareness grows, emotion is born, but it is a controlled emotion, because its cause is understood." Many poems are quoted in full and discussed.

The Apple and the Spectroscope. T. R. HENN. Methuen, 1951.

" Lectures on poetry designed (in the main) for science students." Based on short poems and passages " which lend themselves to a consideration of the kinds of values which could be readily related, in lectures, to ' the art of living '." This series of lectures met with an enthusiastic response from science students at Cambridge and should be suggestive of both methods and materials suitable for sixth formers studying non-literary disciplines.

The Anatomy of Poetry. MARJORIE BOULTON. Routledge, 1953.

Attempts to explain in a small compass all the useful technical terms with plenty of examples to avoid misunderstanding and to " be helpful to the examination candidate without killing poetry by an excess of formalism and pedantry."

The Discovery of Poetry. P. M. B. LYON. Arnold, 1930.

An elementary text book based on a series of broadcast talks. Though based on a rather unadventurous selection of poetry, it has stood the test of time quite well.

The Experience of Poetry in Schools. Ed. Victoria V. Brown. Oxford U.P., 1953.

On the Teaching of Poetry. ALEXANDER HADDOW. Blackie, n.d.

The Poetic Image. C. DAY LEWIS. Jonathan Cape, 1947.

The Clark lectures given at Cambridge, 1946. Not explicitly about teaching but more useful than many books that are.

Spoken Poetry in the Schools. MARJORIE GULLAN. Methuen, 6th edn., 1935.

PROSE

The Anatomy of Prose. MARJORIE BOULTON. Routledge, 1954.

A companion volume to " The Anatomy of Poetry." Attempts " to furnish some guidance to the elementary technical analysis of prose and to offer distinctions and definitions that give the student the possibility of saying something and, more important, wondering about something."

Understanding Fiction. CLEANTH BROOKS and ROBERT PENN WARREN. Appleton Century Crofts. N.Y., 1934.

The authors believe that because most students voluntarily read a good deal of fiction, the art of fiction tends to be neglected by teachers of literature. Commentary and questions on a large selection of stories and excerpts arranged under the following headings: 1. The intentions of fiction; 2. How plot reveals; 3. What character reveals; 4. What theme reveals; 5. Special problems.

Reading a Novel. WALTER ALLEN. Phoenix House, revised 1956.

An excellent brief introduction; the emphasis is on the recent novel in English. Seven novels from " Middlemarch " to " Lucky Jim " are discussed in the final chapter.

Reading for Vision. KATHLEEN E. MORGAN. Arnold, 1953.

Emphasises the discipline as well as the delight of reading literature. Four introductory chapters followed by commentaries on the selection in " The Window of Prose."

An Introduction to the English Novel. ARNOLD KETTLE. Hutchinson's University Library, 1951-3.

Vol. I. To George Eliot. Vol. II. Henry James to the present day. In each volume the author makes a shrewd and challenging analysis of a few significant works from a not inflexible Marxist standpoint.

The English Novel. WALTER ALLEN. Phoenix House, 1954.

" A short critical history." In fact, amply detailed for sixth form work.

English Prose Style. HERBERT READ. Bell, 1949.

Part I. Composition. Part II. Rhetoric. Not an elementary book, but should be valuable for revealing the complexity involved in answering apparently simple questions like " What is prose? " and " What is style? "

The Craft of Fiction. PERCY LUBBOCK. Jonathan Cape, 1921.

An influential treatise which still makes fresh reading.

A Treatise on the Novel. ROBERT LIDDELL. Jonathan Cape, 1947.

Some Principles of Fiction. ROBERT LIDDELL. Jonathan Cape, 1953.

DRAMA

The Player's Library. Four volume catalogue of the British Drama League's Library. Faber and Faber, 1950-56.

A very comprehensive catalogue of plays and books on all aspects of drama.

The Guide to Selecting Plays. Part V. Handbook of Plays for Children and Youth Clubs. Samuel French, 1955-6.

Books and Materials for School and Youth Drama. JOAN M. COLLINS. Dobson, 1956.

Drama and Education. P. A. COGGIN. Thames and Hudson, 1956.

A scholarly historical survey from ancient Greece to the present day. The later chapters are likely to be particularly valuable for their survey of the relationship between drama and modern educational theory.

Child Drama. PETER SLADE. University of London Press, 1954.

A large, illustrated and somewhat effusively written book by a teacher of drama of undoubted originality and influence. Concerned primarily with mime, dance drama and all kinds of spontaneous dramatic play rather than with plays. His claim that child drama is an art form in its own right and the value of his methods have been substantiated by the work of many other teachers in recent years.

An Introduction to Child Drama. PETER SLADE. University of London Press, 1958.

A shorter account of the author's fundamental principles and methods.

Leap to Life. An experiment in youth drama. JOHN WILES and ALAN GARRARD. Chatto and Windus, 1957.

A stimulating account of the method of movement and mime to music (sometimes called Dance Drama) developed by Alan Garrard with children in secondary modern schools and youth clubs.

Shakespeare and the Young Actor. GUY BOAS. Rockliff, 1955.

A practical guide to production based on the author's work at Sloane School, Chelsea.

Shakespeare and the Classroom. A. K. HUDSON. Heinemann, 1954.

Compiled for The Society for Teachers of English. Wittily argues the case for the ' acting ' or ' stage-centred ' method of approach (even when working for G.C.E. exams), rather than the more usual non-dramatic or ' construe ' method which treats children as textual scholars in embryo. Plenty of practical examples and useful appendices including a bibliography of the most useful books on Shakespeare and his background.

Moonlight at the Globe. RONALD WATKINS. Michael Joseph, 1946.

An essay in Shakespeare production based on a performance of " A Midsummer Night's Dream " at Harrow School.

Going to the Theatre. JOHN ALLEN. Phoenix House, 1949.

A book about the professional theatre written for children. One of the useful ' Excursions ' series for young people.

Dramatic Work with Children. E. M. LANGDON. Dobson, 1948.

What can and should be done in dramatic work with children aged 5-14. A valuable short study.

Group Playmaking. MARY KELLY. Harrap, 1948.

Outlines the purpose and methods of encouraging children to make their own plays as a group activity.

Directing the Play. (A source book of Stagecraft). Ed. Toby Cole and Helen Chinog. Vision Press, 1954.

Essays by many hands on the art of the director in the theatre.

Drama in Performance. RAYMOND WILLIAMS. Frederick Muller, 1954.

Discusses and illustrates from specific plays a method of dramatic analysis and the relationship between text and performance.

The Anatomy of Drama. MARJORIE BOULTON. Routledge, 1960.

Intended to increase the understanding of drama among young people who do not have easy access to the live theatre and who therefore study plays chiefly as printed books. Suitable reading for older school children.

Theatre in the Round. MARGO JONES. Rinehart, N.Y. 1951.

Not specifically about work with or for children but might be stimulating to the teacher who wants to break out of the picture-frame.

A Drama Teacher's Handbook. PAMELA BLACKIE. Blackwell, 1956.

" This book has been written primarily to help teachers in institutes, schools and clubs who find themselves in positions of dramatic authority with only a modicum of stage experience behind them." Not the comprehensive manual its title suggests. A brief review of acting techniques with a series of exercises, mimes and ' snippet ' scenes.

Drama in Schools: Approaches, methods and activities. E. J. BURTON. Herbert Jenkins, 1955.

One of a useful series of Practical Stage Handbooks (general editor: Harold Downs) covering most aspects of amateur dramatics. Contains chapters on " The Place of Drama in Education," " The School Play " and practical suggestions on methods and materials at all stages from the infants' school to the sixth form.

Classroom Dramatics. RODNEY BENNETT. University of London Press, 1938.

Practical advice on methods, materials and equipment for all kinds of dramatic work in the classroom from infancy to adolescence.

The Amateur Producer's Handbook. F. SLADEN-SMITH. University of London Press, 2nd edn., 1948.

Brief and practical.

Children and the Theatre. C. E. FISHER and H. G. ROBERTSON. Stanford U.P. and O.U.P., revised 1950.

Concerned with selecting, casting, rehearsing, dressing, etc., plays by child actors for child audiences.

Theatre for Children. WINIFRED WARD. Children's Theatre Press, U.S.A., revised 1950.

Creative Dramatics. WINIFRED WARD. Appleton Century, U.S.A. n.d.

The development of children through the creating of original dramatisations.

Twenty-one Years with Children's Theatre. CHARLOTTE B. CHORPENNING. Children's Theatre Press, U.S.A., 1954.

A record of the author's experience in writing and producing for children in the theatre.

Drama in Schools and Youth Centres. G. H. HOLROYD and NORA RATCLIFFE. Macdonald, 1949.

Appraising a Play. HAROLD DOWNS. (Practical Stage Handbooks). Herbert Jenkins 1955.

Play Production with Children and Young People. JOHN ALLEN. (Theatre in Education Series), Dobson, 1956.

Let's Do some Acting. ANTHONY PARKER. Bodley Head, 1955.

Amateur Stage Handbook. P. HAMILTON. Pitman, 1957.

Handbook for the Amateur Theatre. Ed. Peter Cotes. Oldbourne Press, 1957.

Publications of the

NATIONAL FOUNDATION FOR EDUCATIONAL RESEARCH

BOOKS

1. A List of Researches in Education and Educational Psychology. 1918-48. By A. M. Blackwell, M.A., B.Sc., £1 1s. od.

2. The Allocation of Primary School Leavers to Courses of Secondary Education. First Interim Report. By A. F. Watts, M.A., D.Lit., and Patrick Slater, M.A., 7s. 6d.

3. A Survey of Rewards and Punishments in Schools. Based on Researches carried out by M. E. Highfield, M.A., Ph.D., and A. Pinsent, M.B.E., M.A., B.Sc., £2 2s. od.

4. The Educability of Cerebral Palsied Children. By M. I. Dunsdon, M.A., F.B.Ps.S., £1 1s. od.

5. A Second List of Researches in Education and Educational Psychology, 1949-51. By A. M. Blackwell, M.A., B.Sc., £1 1s. od.

6. Secondary School Entrance Examinations. By A. F. Watts and others, 6s. 6d. net, (cloth cased), 3s. 6d. (limp covers).

7. Lists of Researches in Education and Educational Psychology. Supplement I. 1952-53. By A. M. Blackwell, M.A., B.Sc., 10s. 6d.

8. Pupils' School Records. By Alice S. Walker, B.Sc., £1 1s. od.

9. Lists of Researches in Education and Educational Psychology. Supplement II. 1954-55. By A. M. Blackwell, M.A., B.Sc., 15s.

10. Admission to Grammar Schools. Third Interim Report on the Allocation of Primary School Leavers to Courses of Secondary Education. By Alfred Yates, B.A., B.Ed., and D. A. Pidgeon, B.Sc., £1 5s. od.

11. Lists of Researches in Education and Educational Psychology. Supplement III. 1956-57. By A. M. Blackwell, M.A., B.Sc., 15s.

12. Reading in the Primary School. By Joyce M. Morris, B.A., Ph.D., with a Statistical Appendix by P. M. Grundy, B.A., Ph.D., 15s. net.

Orders for the Foundation's Publications should be placed with its Publishers—

Newnes Educational Publishing Co., Ltd.
Tower House, Southampton Street, Strand, London, W.C.2

CONTENTS

PAGE

Articles

Social Structure, Language and Learning. *Basil Bernstein* 163

Dull and Backward Children: Post-War Theory and Practice. *S. S. Segal* 177

The Teaching of Mathematics—IV: Teaching Arithmetic by Concrete Analogy—I: Miming Devices (continued). *J. D. Williams* 195

Research Notes

Length of Schooling and its Effect on Performance in the Junior School. *D. A. Pidgeon and Evelyn M. Dodds* 214

The Image of Technician Occupations Among School-Leavers. *Stephen Cotgrove and Frank Barr* 222

Bibliography

The Teaching of English Literature in Secondary Schools. *M. K. Paffard* 228